CLINICAL PROFILE AND OUTCOME OF BRONCHIOLITIS IN AGE GROUP OF 1 – 24 MONTHS

Dissertation Submitted to

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfillment of the regulations

For the award of the degree of

M.D. DEGREE EXAMINATION

BRANCH VII PEDIATRICS

STANLEY MEDICAL COLLEGE AND HOSPITAL

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

CHENNAI

APRIL - 2011

CERTIFICATE

This is to certificate that this dissertation entitled **"CLINICAL PROFILE AND OUTCOME OF BRONCHIOLITIS IN AGE GROUP OF 1-24 MONTHS"** is the bonafide work done by **Dr.D.M.DEENADAYALAN** submitted as partial fulfillment for the requirement of M.D. Degree Examination. PAEDIATRIC MEDICINE (Branch VII) to be held in April 2011.

Professor
Department of Pediatrics
Inst. Of Social Pediatrics
Stanley Medical College & Hospital,

Professor and HOD.,
Dept. of Pediatrics
Inst. Of Social Pediatrics
Stanley Medical College & Hospital.

Dr. C. VAMSADHARA, MD., Ph.D.,
Dean
Stanley Medical College,
Chennai

ACKNOWLEDGEMENT

I sincerely thank our Dean, **Dr. C. VAMSADHARA M.D., Ph.D.,** Stanley Medical College, **Dr. A. PRIYA, M.S., D.O.,** Medical Superintendent, Government Stanley Hospital for granting me permission to conduct this study at Govt. Stanley Hospital.

I extend my hearty thanks to **Prof. Dr. AMUTHA RAJESWARI M.D., D.C.H.**, Director, Institute of Social Pediatrics, Govt. Stanley Medical College for having very much supportive and encouraging for conducting this study.

I also thank **Prof. Dr. SUJATHA SRIDAHRAN M.D, D.C.H,** Chief, Pediatric Medicine unit II & **Prof. Dr. KARUNAKARAN M.D, D.C.H**, Chief, Pediatric Medicine unit III for their valuable support.

I also thank **Prof. Dr. SUNDARI, M.D., D.C.H., Prof. Dr. JOHN SOLOMON, M.D., D.C.H., Prof. Dr. CHANDRA MOHAN, DM (NEURO)., M.D., D.C.H.**, Professors, Institute of Social Pediatrics for their valuable suggestions.

I would like to offer my gratitude to the Registrar, **DR.M.A.ARAVIND, M.D, D.C.H,** for his kindness and valuable suggestions throughout my study.

I also thank Assistant Professors**, Dr.C.N.KAMALARATHINAM, M.D., D.C.H., Dr. J. GANESH, M.D, D.C.H., Dr. ELANGO, M.D., D.C.H., Dr. EKAMBARANATH, M.D., Dr. RADHIKA, M.D., Dr.RATHINAVEL, M.D., Dr. RAJA, M.D., Dr. KUMAR, D.C.H., Dr.ANBU M.D., D.C.H**., for their critical reviews and suggestions.

I am greatly indebted to all co – postgraduates who have been the greatest source of encouragement, support, enthusiasm, criticism and friendly concern and timely help.

Last but not the least I owe my sincere thanks and gratitude to all the children and their parents without whom this study would not have been possible.

CERTIFICATE FOR APPROVAL OF ETHICAL COMMITTEE

To

Dr.D.M.Deenadayalan, PG in MD(Paed)

Dear **Dr. D.M.Deenadayalan, PG in MD(Paed)**

The Institutional Ethics Committee reviewed and discussed your application for approval of the project entitled

"Clinical Profile and outcome of Bronchiolits in Age group of 1-24 months "

The following members of the ethics committee were present at the meeting held on 28.01.2010 at the Council Hall, Stanley Medical College, Chennai-1 at 10.00AM

Dr.C.B.Tharani, Director of Pharmacology,
Madras Medical College, Chennai-3 - Chairman of the Ethics Committee
Dr.S. Chitra, Vice-Principal,
Stanley Medical College, Chennai – 1- Member Secretary of the Ethics Committee

MEMBERS

Dr.Jayanthi
Prof.of Medical Gastroenterology
Dr.Madhavan
Prof.of Pharmacology
Dr.E.Dhandapani
Prof.of Medicine
Dr.Sujatha Sridharan
Prof.of Paediatrics
Thiru.Pachaiappan,
Junior Administrative Officer,
Thiru.A. Senthil Manoharan,
Advocate

We approve the project to be conducted in its presented form.

The Institutional Ethics Committee/Independent Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

Yours sincerely,

Member Secretary,
Ethics Committee

MEMBER SECRETARY
ETHICAL COMMITTEE,
STANLEY MEDICAL COLLEGE
CHENNAI-600 001.

CONTENTS

INTRODUCTION

INTRODUCTION

Bronchiolitis remains one of the greatest clinical challenges in pediatric care. Bronchiolitis is a disease of lower respiratory tract that occurs in young children (below 2yrs) and caused by infection with seasonal virus such as RSV, influenza, Adenovirus, influenza and etc.

It is a leading cause for the hospitalization of young children, associated with high degree of morbidity but low mortality (<1%). About 20% of infants in the United States get bronchiolitis each year and 2-3% of them require hospitalization. Children younger than one year of age are almost twice as likely to develop bronchiolitis. Currently there is no enough data to determine bronchiolitis rate in the developing and underdeveloped countries.

Definition of bronchiolitis varies between the published studies. As per AAP guideline[1] defined bronchiolitis as "a constellation of clinical symptoms and signs including upper respiratory prodrome followed by increased respiratory effort and wheezing in children less the two years of age."

There are many medical factors which increases the risk of severity of the disease such as prematurity, low birth weight, chronic lung disease,

congenital heart disease and immunodeficiency (congenital and acquired).

In addition to this, there are many non medical factors which also increase the severity of the disease, thereby leading to increased hospitalization rates. The non medical risk factors are feeding practices (breast feeding or bottle feeding), family history of asthma, passive smoking, indoor allergens (wood burning stove and mosquito coils), overcrowding, number of sibling in the family and lower socio-economic status.

Many studies have documented the association of non medical factors with severity of the disease, some of which are easily preventable. Nowadays studies are more concentrating on the management of the disease rather than prevention of these factors which are more effective method to reduce the morbidity of the disease.

Hence it is time to emphasize the importance of the prevention of non medical risk factors to reduce the hospitalization rate and duration of the hospital stay.

Review Of Literature

REVIEW OF LITERATURE

History

Jeffrey et al[2] he mentioned that bronchiolitis was first described as a distinct clinical entity in 1941 after a small influenza epidemic affected a large number of young children in the United Kingdom.

Hubble and Osborn[3] wrote that "acute bronchiolitis is the essential pulmonary lesion in epidemic influenza… This condition is particularly common in young children, in whom it produces urgent dyspnoea and, if not vigorously treated, death by asphyxia."

Since that time, many more viruses have been implicated in bronchiolitis, including respiratory syncytial virus (RSV) and human Metapneumovirus. It has become one of the most common diagnoses made by pediatric emergency physicians.

Definition

Definitions of bronchiolitis vary and may account for some of the variability in the clinical evidence derived from published studies.

In the United Kingdom, the authors of University of Nottingham study derived a consensus definition of "a seasonal viral illness

characterized by fever, nasal discharge, and dry, wheezy cough. On examination there are fine inspiratory crackles and/or high-pitched expiratory wheeze."[4]

As per AAP guideline[1], bronchiolitis is a "constellation of clinical symptoms and signs of a viral upper respiratory prodrome followed by increased respiratory effort and wheezing in children less than 2 years of age."

Burden of bronchiolitis

RSV bronchiolitis is recognized as the most important cause of serious lower respiratory tract illness in infants and young children worldwide leading to hospitalization in a great number of cases.

According to AAP[1], the epidemiologic study results of bronchiolitis have suggested a high degree of morbidity but low mortality. More than one third of children develop bronchiolitis during the first 2 years of life. Of these, 3% of all infants in the United States will be hospitalized, up from approximately 1% in the 1970s.

SIGN[5] (Scottish Intercollegiate Guideline Network) 2006, nation clinical guidelines stated that the burden of the disease is significant. 3% of all infants younger than one year of age are admitted to hospital with

bronchiolitis. In Hong Kong study by R.Y.T.Sungi et al[6], they accounted for 6.6% of total pediatrics admissions.

Incidence of hospitalization

Hans-Olav Fjaerli et al[7] in his population based retrospective study, he found that mean annual hospitalization incidence were 21.7 per 1000 children under one year of age, 6.8 per 1000 children at 1 – 2 years of age and 14.1per 1000 under 2 years of age.

R.Y.T.Sungi et al[6] in his study, found that a case incidence of bronchiolitis requiring admission to hospital was about 21 per 1000 children under 2 years of age. John et al[9] wrote that acute bronchiolitis also occurs in developing countries in the tropics; there is limited knowledge about its cause and epidemiology in tropical regions of the world.

Few studies attempted to quantify the incidence rates of RSV infection in developing countries. (Borrero et al[10]. 1990; Dagan et al[11]. 1993). The reported incidence rates vary between 10/1000 children under one year of life for hospitalization with RSV-ALRI in southern Israel[11], to 198/1000 child years for the age group between birth and 18 months in a community-based study from Colombia[10].

Etiology

Wright AL et al[12] mentioned that RSV continues to account for 50% to 80% of bronchiolitis cases. Other causes include the parainfluenza viruses type 3, influenza, Human Metapneumovirus (HMPV), rhinovirus, adenovirus and etc.,

Boivin et al[13] in his extensive study on human Metapneumovirus, they found that HMPV has been estimated to account for 3% to 19% of bronchiolitis cases.

John et al[9] was done a study in South India, he found that in South India, acute bronchiolitis tended to occur in outbreaks between August and November, coincided with RSV outbreaks. These findings suggest that bronchiolitis is a viral rather than bacterial disease.

Semple MG et al[18] was found that the rate of co- infection have ranged from 10% to 30% of hospitalized children, most commonly with RSV and either HMPV or rhinovirus.

One study from Delhi[15], Viral identification rate was 46.12%. RSV was isolated in 29.38%, adenovirus in 7.75%, influenza virus (type A &B) in 1.22%, parainfluenza virus in 3.67 %, rhinovirus in 5.31% and

Metapneumovirus in 10.88%. Mixed infections were documented in 6.6% of cases.

Rakes GP et al[16] found that the role of rhino virus is unclear because of their well documented role in triggering exacerbations of wheezing among older children with reactive airway disease or asthma.

Respiratory Syncytial Virus

RSV causes 85% of all bronchiolitis. It is highly contagious and can be spread through physical contact (kissing, shaking hands) or through with inanimate objects (toys, towels) that an infected person has touched.

RSV can survive for 30mins on a person's hands and for as many as 5 hours on objects. It can become airborne when infected persons sneeze and cough or laugh, and enter the body through eyes and nose. In most cases infected by family members, friends or children who attend the same daycare.

Pathogenesis

The pathological picture of bronchiolitis is important in understanding the clinical manifestations and developing rational management.

The type of injury and clinical manifestations of the respiratory tract induced by viral diseases are probably consequences of the combination of the viral affinity for specific cells in segments of the airways (tropism), the destructive effect at the cellular level (virulence), the size of the respiratory passage in the host, and the immunologic response elicited.

Although RSV is one of the least destructive of the respiratory viruses in vitro, its high affinity for the bronchial epithelium explains the tendency to produce major respiratory disease. Inoculation of RSV presumably occurs through the nasal mucosa surface then spreading to the lower respiratory tract mechanism which is poorly understood, presumably through aspiration of infected secretions which produce bronchiolitis[17].

The primary immune response consists of tissue infiltration by recruited polymorphonuclear leukocytes and macrophages after the release of chemical messengers from damaged epithelial cells. These cells release more mediators, which alter endothelial permeability, epithelial junctions, and ion transport, thereby exacerbating inflammation with additional cell recruitment and promoting edema[18]. The increased luminal contents with secretions and cellular debris account in part for airway

obstruction, limiting air flow, and producing atelectasis and a consequent ventilation-perfusion mismatch.

Gardner PS et al[19] in his study on pathogenesis of RSV he mentioned that smooth muscle contraction is another mechanism of airway obstruction. Besides abnormalities of the adrenergic and cholinergic systems during respiratory viruses, the non-adrenergic non-cholinergic system (NANC) can also induce bronchoconstriction following epithelial damage. Neuropeptides are the chemical mediators of this system. Some of them (e.g., substance P, tachykinins, and calcitonin gene-related peptide [CGRP]) have the potential of inducing obstruction, but their role in bronchiolitis requires further elucidation[20] which may explain the limited benefit of bronchodilators observed in clinical studies.

The decrease of T-suppressor lymphocytes with increased T-helper/T-suppressor ratios could play a role in the pathogenesis of acute bronchiolitis, allowing IgE hyper production and alveolar mast cell activation[21]. The specific cell response to RSV seems to be more intense in children under six months and in more severe cases[22].

Some authors state that antigen-antibody complexes could participate in the pathogenesis of bronchiolitis. The maternal neutralizing antibodies against RSV, passively acquired by the fetus, might be

responsible for the high incidence of the disease in the first months of life. Other findings contradict this hypothesis in reporting no correlation between passive and active antibodies and severity of the disease[23].

Glezen et al[24] in a prospective, randomized study of risk factors in bronchiolitis admitted that passive antibodies might be protective.

The pathogenic mechanisms in bronchiolitis are still obscure. The ability to recover after RSV infection is related to IgA, IgG, and IgM secretory immunoglobulin levels and antibody-dependent, cell-mediated cytotoxicity (ADCC). These mechanisms could account for the mild symptoms seen in re-infections. The variation in clinical findings in small children might result from underdeveloped individual host defenses[17].

Clinical Features

Iqbal et al[25] found that mean age of children was 11.3 ± 5.6 months. Other studies by Uyan[26] and Arif A[27] reported relatively younger age groups (6.9 ± 3.4 months, 5.4 ± 9.4 months, respectively). This difference may be due to small sample size in their studies. He also documented an overall male preponderance (57%), which was similar to studies by Uyan[26] (58%) and Arif A[27](68%).

AAP[1] stated that in their guideline, the highest incidence of RSV occurring between December and March. Hans-Olav Fjaerli et al[7] done a population based retrospective study in Northern Europe; he reported that the high number of admission was recorded during winter months December – April. John et al[9] done a study in South India, he stated that acute bronchiolitis tented to occur in outbreaks between August and November.

In Hong Kong, R.Y.T.Sungi et al[6] in his study, he surprised to find that acute bronchiolitis was prevalent in the middle part of the year, between April and October. In sharp contrast with that reports from U.S[29], from U.K[19] and from Australia[29], they found that epidemic of acute bronchiolitis invariably occur in winter and early spring.

RSV infections occur most frequently in the cold season in areas with temperate and Mediterranean climates and in the wet season in tropical countries with seasonal rainfall. The age group mainly affected by RSV in developing countries is children less than 6 months of age. RSV-ALRI is slightly more common in boys than in girls[30].

Pinnington LL et al[31] clearly stated that most aspects of feeding are less efficient during periods of respiratory illness and Coordination of breathing during feeding is also significantly impaired.

A Maffey et al[32] concluded that there was a no risk of aspiration during acute RSV-bronchiolitis. Aspiration is likely to play a role when rapid deterioration occurs in infants with RSV bronchiolitis[33].

Oski's **pediatric** textbook[34] quote that infants with RSV bronchiolitis may be high risk for aspiration which also may be manifest as wheezing.

Early symptoms are those of viral upper respiratory tract infections including mild rhinorrhea, cough and sometimes low-grade fever. Sixty percent of primary RSV infections are confined to the upper airway. During a period of 2-5 days this may progress to lower respiratory tract involvement with the development of cough, dyspnea, wheezing and feeding difficulties. Severe cases progress to respiratory distress with tachypnea, nasal flaring, retractions, irritability and cyanosis[26].

Iqbal et al[25], he studied on total of 107 children among age group between 2months to 2years, he found that 91% had respiratory distress at the time of presentation, 76% had nasal flaring, 72% wheezing, 64% had fever, 41% retractions and 32% had decreased feeding. A previous study[27] concluded that respiratory distress (97.5%) was consistent clinical feature.

Clinical Course

Most patients have mild clinical illness and recover uneventfully in 5-7 days but coughing may persist for up to 2 weeks[35]. Median hospital stay for normal children is 3-5 days and less than 10% require ventilation[36]. Most will have normal respiratory parameters 2 weeks after the height of the illness and radiologic abnormalities will clear within 9 days of admission. However, 20% of normal children will have a protracted course with wheezing and abnormal pulmonary function studies for many months.

Higher risk factors

There is a no doubt that various high risk factors are associated with severity of the disease which was evidenced by the various studies from all part of the worlds. These are prematurity[37], children with immunodeficiency (acquired or congenital)[38], underlying respiratory illnesses such as chronic lung disease (CLD; known as BPD)[36] and those with significant congenital heart disease[39].

Male sex, young age, day care attendance, and crowding/siblings are independent risk factors for the development of severe RSV LRI[40].

Gestational age, birth order, birth weight, and exposure to tobacco

smoke affected the prevalence and severity of RSV-related lower respiratory tract disease.

Iqbal et al[25] he found that 38 percent of the children were breast fed. This is different from Arif A[27] (66%) and Rani R[42] (91%). This difference may be due to relatively small sample size in their studies (85 and 100 respectively). He also documented that 38% of the children had family history of acute respiratory tract illness and 14% children had family history of allergy. Christakis DA et al[43] reported 57% children with family history of acute respiratory tract illness and 71% family history of allergy.

The severity of the four epidemic seasons, seven predictors for hospitalization for RSV infection were found in the bivariate analysis: number of children in the family, chronological age at the onset of RSV season, birth weight, gestational age, birth order, daycare attendance and previous RSV infections. In the logistic regression analysis, only three predictors were detected: chronological age at the beginning of RSV season, birth weight category and birth order[41].

Vanda Bento et al[44] ,a total of 328 children were studied 41% of the patients were from a poor socioeconomic context, 55.8% had older

siblings and 32.2% had smoking parents and 11.3% had reactive airway disease.

A hospital based prospective study from India was carried by Das et al[45] found that birth weight (LBW)/premature babies & non breastfeeding practices were significant risk factors for severe bronchiolitis.

Although there is no doubt that secondhand Environmental Tobacco Smoke (ETS) exposure contributes to lower respiratory tract infection in infants and young children in developing countries[46] and industrialized nations[47] the evidence for a specific effect on RSV LRTI is less clear.

Carroll et al[48] present probably the largest population-based study of term infants with bronchiolitis to determine the association between maternal asthma, maternal smoking, and the incidence and severity of bronchiolitis. Infants of mothers with asthma who smoked had a higher risk for emergency department visits and hospitalizations. Although maternal smoking increased the risk of prolonged hospitalization by 19%, if the mother was smoking and had asthma the increased risk was 38%.

The major limitation of his study is that other risk factors that are well known to be associated with hospitalization for RSV or bronchiolitis such as an index of crowding that includes the number of sibling and adults in the household, day-care exposure, or day-care exposure of siblings or the presence of siblings, birth during the first half of the RSV season, and a putative risk factor (breastfeeding) were not included in these analyses[40].

In an examination of atopic risk factors, although a maternal history of asthma was considered, that of other relatives or other conditions such as atopic dermatitis or allergic rhinitis in first-degree relatives was not included in the analysis[49].

An initial study in Rochester, New York[38], conducted between 1974 and 1976, suggested that there is a significant difference between children hospitalized with RSV and controls in the amount of environmental tobacco smoke exposure.

SHS exposure may increase the severity of bronchiolitis in RSV-infected infants by enhancing production of cysteinyls LTE4 in infants[50].

D G Sims et al[51], in his study concluded that large families and overcrowding among poorer families seem to lead to a higher incidence

of RSV infection, and measures to reduce overcrowding and improve housing should help to reduce the spread of infection. Breast-feeding also protects infants from infection.

Lower Socio-Economic groups, where the risk of RSV disease is high. Iqbal et al[25] study had documented that 62% of the children belonging to poor socioeconomic class which is consistent with that reported by Sarfraz et al[52].

Laboratory investigations

Chest x ray

AAP[1] said that radiography may be useful when the hospitalized child does not improve at the expected rate, if the severity of disease requires further evaluation, or if another diagnosis is suspected.

Chest X-rays, although nonspecific, can provide complementary diagnosis. Visible radiographic manifestations include diffused lung hyperinflation with increased lung volume, hyperlucency, flattening of the diaphragms, and prominent bronchovascular markings with an interstitial infiltrate pattern. Atelectatic areas from mucoid plugging and low-density infiltrates are often seen, and pleural thickening may also be evident.

Two studies[36, 37] suggested that the presence of consolidation and atelectasis on a chest radiograph is associated with increased risk for severe disease. One study showed no correlation between chest radiograph findings and baseline severity of disease.

In prospective studies including one randomized trial, children with suspected LRTI who received radiographs were more likely to receive antibiotics without any difference in time to recovery[53]. Current evidence does not support routine radiography in children with bronchiolitis. However, Chest X rays may be obtained as clinically indicated when the diagnosis of bronchiolitis is not clear and when subtle worsening of the respiratory status occurs, or with preexisting cardiac or lung disease[53].

Other diagnostic tests

Bronchiolitis is a clinical diagnosis that does not require diagnostic testing. The clinical utility of diagnostic testing in infants with suspected bronchiolitis is not well supported by evidence[54]. The occurrence of serious bacterial infections (SBIs; e.g. urinary tract infections [UTIs], sepsis, meningitis) is very low[55]. The use of complete blood counts has not been shown to be useful in either diagnosing bronchiolitis or guiding its therapy.

Virology tests for RSV, the knowledge gained from such testing rarely alters management decisions or outcomes for the vast majority of children with clinically diagnosed bronchiolitis.

Management

General

The main benefits of hospitalization of infants with acute bronchiolitis are:

- The careful monitoring of clinical status
- Maintenance of a patent airway (through suctioning & mucus clearance).
- Maintenance of adequate hydration
- Parental education

Monitoring of clinical status

In bronchiolitis, monitoring has a significant part of the treatment because of the dynamic nature of the disease. Children may become worsen after admission that is why we have to assess effect of respiratory distress on the feeding ability, the hydration status of the children, respiratory rate, increasing respiratory effort and cyanosis (oxygenation by pulse oximetry).

AAP[1] stated that the substantial temporal variability in physical findings as well as potential differences in response to therapy may need repeated observation over a period of time rather than a single examination may provide a more valid overall assessment.

Pulse oximetry has been rapidly adopted into clinical assessment of children with bronchiolitis on the basis of data suggesting that it can reliably detect hypoxemia that is not suspected on physical examination[36].

Few studies have assessed the effectiveness of pulse oximetry to predict clinical outcomes. Among inpatients, perceived need for supplemental oxygen that is based on pulse oximetry has been associated with higher risk of prolonged hospitalization, ICU admission, and mechanical ventilation[56]. Among outpatients, available evidence differs on whether mild reductions in pulse oximetry (less than 95% on room air) predict progression of disease or need for a return visit for care[57.]

Oxygen

AAP[1] recommendation is supplemental oxygen is indicated if oxy-hemoglobin saturation (SpO_2) falls persistently below 90% in previously healthy infants. If the SpO_2 does persistently fall below 90%, adequate

OXYGEN THERAPY

supplemental oxygen should be used to maintain SpO_2 at or above 90%. Oxygen may be discontinued if SpO_2 is at or above 90% and the infant is feeding well and has minimal respiratory Distress.

The infant with acute bronchiolitis and respiratory distress should be hospitalized if sustained SpO_2 is below 92% in room air[58]. Sometimes respiratory failure can requires mechanical ventilation especially in high risk groups.

Hydration status

The mainstays of therapy for patients with bronchiolitis are fluid replacement and oxygen supplementation. These infants are mildly dehydrated because of decreased fluid intake and increased fluid losses from fever and tachypnea. The goal of fluid therapy is to replace deficits and provide maintenance requirements.

Excessive fluid requirements should be avoided as this may promote interstitial edema formation which was evidenced by the possibility of fluid retention related to production of ADH has been reported in patients with bronchiolitis[59]. Clinicians should adjust fluid management accordingly.

Airway clearance

Suctioning of the nares may provide temporary relief of nasal congestion. There is no evidence to support routine “deep” suctioning of the lower pharynx or larynx.

A Cochrane review 123 found 3 RCTs that evaluated chest physiotherapy in hospitalized patients with bronchiolitis. No clinical benefit was found using vibration and percussion techniques.

Bronchodilators

Bronchodilators have been commonly used in the management of bronchiolitis. A Canadian study[36] found that 78% of those hospitalized with bronchiolitis received bronchodilators. A survey of pediatric allergists and pulmonologists in the United States[61] found that 86% recommended a trial of bronchodilators for this condition. Similarly, in a survey of pediatric infectious disease specialists in Europe, the majority used bronchodilators for treatment of bronchiolitis[62].

Prior meta-analyses[64] and a systematic review [65] have shown that bronchodilators may improve clinical symptom scores but they do not affect disease resolution, need for hospitalization or length of stay.

Glucocorticosteroids

Despite the prominent role that inflammation plays in the pathogenesis of airway obstruction, corticosteroid use remains controversial.

In a recent randomized, double-blind, placebo controlled trial in children admitted to the hospital with RSV bronchiolitis, prednisolone (1mg/kg/day orally for 7 days) was thought to be effective in accelerating the clinical recovery of these children[62].

One study [65] concluded that oral dexamethasone therapy does not affect the clinical course of children hospitalized with bronchiolitis. Currently, the evidence for the use of glucocorticosteroids for children with bronchiolitis is equivocal[1].

Antibiotics

AAP[1] recommended that antibacterial medications should be used only in children with bronchiolitis who have specific indications of the coexistence of a bacterial infection. Otherwise antibiotics are not recommended for bronchiolitis.

Ribavirin

The current recommendation of the AAP[1] is that ribavirin aerosol therapy may be considered only patients with complicated CHD, including pulmonary hypertension; patients with BPD, cystic fibrosis, and other chronic lung disease; patients with underlying immunosuppressive disease; patients who are severely ill with or without mechanical ventilation; and hospitalized patients who are younger than 6 weeks or who have underlying conditions such as multiple congenital anomalies or certain neurological and metabolic diseases.

Parental education

According to the AAP[1], frequent hand washing is the most important strategy for reducing the burden of RSV disease. Hands should be decontaminated before and after direct contact with patients, after contact with inanimate objects in the direct vicinity of the patient, and after removing gloves. Alcohol-based rubs are preferred for hand decontamination. An alternative is hand-washing with antimicrobial soap. Clinicians should educate personnel and family members on Hand sanitation.

Infants should not be exposed to passive smoking. Breastfeeding is recommended to decrease a child's risk of having lower respiratory tract disease. General prevention measures that can be undertaken by family members include smoking cessation, breastfeeding, and avoiding situations, whenever possible, where exposure to RSV cannot be controlled.

McCartney KK[66] et al clearly demonstrated that promoting hand-washing and good hygiene practices to be adopted when coughing can help reduce the transmission of acute respiratory infection.

Palivizumab

Passive immunoprophylaxis with palivizumab, the only agent approved by the FDA, for the prevention of RSV and reduces hospitalization in high-risk children. Immunoprophylaxis is indicated only for certain high-risk children. The AAP[1] has issued specific guidelines for RSV immunoprophylaxis with palivizumab. Other therapies are emerging for the prevention of RSV, including a new, enhanced-potency, humanized RSV monoclonal antibody and several different types of vaccines.

AIM OF THE STUDY

AIM OF THE STUDY

- To study the clinical profile and outcome (hospital stay) of bronchiolitis in age group of 1 – 24 months.
- To analyze the identifiable risk factors for severity of bronchiolitis.

MATERIALS & METHODS

MATERIALS AND METHODS

Study design : Prospective descriptive study.

Study Period : Aug 2009 to Aug 2010.

Sample size : 222 patients.

Study place : Institute of Social Pediatrics, Government Stanley Hospital, Chennai.

Inclusion criteria:-

1. Previously normal children aged 1 – 24 months.

2. First episode of wheeze suggestive of bronchiolitis as per AAP guidelines.

Exclusion criteria:-

1. Children aged <1 month and > 24 months.

2. Previous episode of wheezing.

3. Children with underlying respiratory disease (CLD, Recurrent pneumonia), cardiac disease (congenital heart disease and myocarditis), preterm, immunodeficiency (congenital or acquired) and signs of sepsis.

Methodology:-

- Children of age group 1 to 24 months who were previously normal, presented with symptoms of viral upper respiratory prodrome followed by increased respiratory effort and wheezing for the first time without any underlying respiratory (CLD known as BPD and Recurrent pneumonia), Cardiac (Congenital Heart Disease and Myocarditis) and Immunodeficiency (Congenital or acquired) were taken to this study as per AAP Guidelines.

- From the history, risk factors were analyzed, which have impact on severity of the disease.

- The factors are :

Birth Weight, Exclusive Breast Feeding, Bottle Feeding, Parental Asthma, Type of family, No. of Children, Socio-Economic Status (Modified Kuppusamy Scales), Passive smoking and Indoor allergen.

- To identify the vulnerable age group who exposed to URI in the family members were noted.

- Temperature was recorded, Children with temperature >39°C were subjected to septic workup.

- Septic workup includes complete blood count, C Reactive Protein, Blood culture and CXR to rule out serious bacterial infections.
- Those who showed positive blood culture, CRP +ve (>6ng) and patchy infiltration in CXR were excluded from the study.
- Severity was assessed by **Wood Downes Score**

Score	**Wheezing**	**Retraction**	**RR**	**HR**	**Ventilation**	**cyanosis**
0	No	No	<30	<120	Good Symmetrical	Yes
1	End expiratory	Subcostal/ intercostal	31-45	>120	Regular Symmetrical	No
2	All expiratory	Supraclavicular + nasal flaring	45-60	-	Very reduced	-
3	Both inspiration and expiration	+intercostal + suprasternal	>60	-	Silent thorax	-

Children who scored below 3 classed as mild cases, 4-7 classed as moderate and 8-14 classed as severe cases.

- Hypoxemia was assessed by pulse oximetry.
- Children with oxygen saturation below 92% on room air were admitted and treated under PICU care, rest were treated in the ward.
- All children were who had SpO_2 below 90% on room air, were treated with humidified warm oxygen as per AAP and intravenous fluids as per their needs.
- Duration of oxygen requirement and duration of hospital stay were analyzed.

Statistical methods used:-

The information collected regarding all the selected cases were recorded in a Master Chart. Data analysis was done with the help of computer using Epidemiological Information Package **(Epi Info 3.4.3)**.

Using this software range, frequencies, percentages, means, standard deviations, chi square and P values were calculated. Pearson chi square test was used to test the significance of difference between two variables. A 'p' value less than 0.05 taken to denote significant relationship. If value of 'p' is more than 0.05 then is taken to denote absence of relationship between the two variables.

RESULTS
&
ANALYSIS

RESULTS AND ANALYSIS

A total of 222 cases were analyzed in our study. Mean age was 6.4 months with Standard deviation of 4.6 months.

Table-I Age distribution of Bronchiolitis

Age (In months)	Children	
	No.	%
1 – 6	130	58.6
7 -12	66	29.7
13 – 18	20	9.0
19 - 24	6	2.7
Total	222	100

Age distribution was more among young children (1-12months). 196 cases (88.3%) were belonged to 1 – 12 months of age, rest of 26 cases (11.7%) were belonged to 13 – 24 months of age groups.

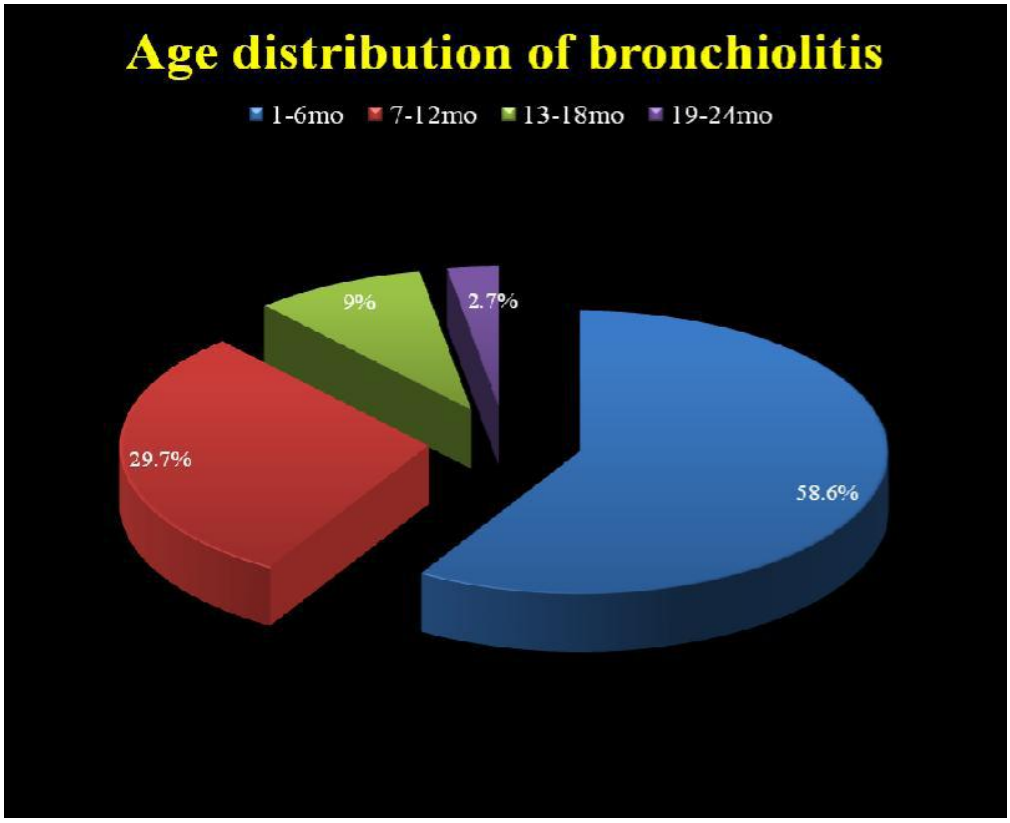

Age distribution of bronchiolitis
1-6mo
7-12mo
13-18mo
19-24mo
9%
2.7%
29.7%
58.6%

Table – II Sex distribution of Bronchiolitis

Sex	Children	
	No.	**%**
Male	129	58.1
Female	93	41.9
Total	222	100

Bronchiolitis was more commonly presented by males (129) than females (93).

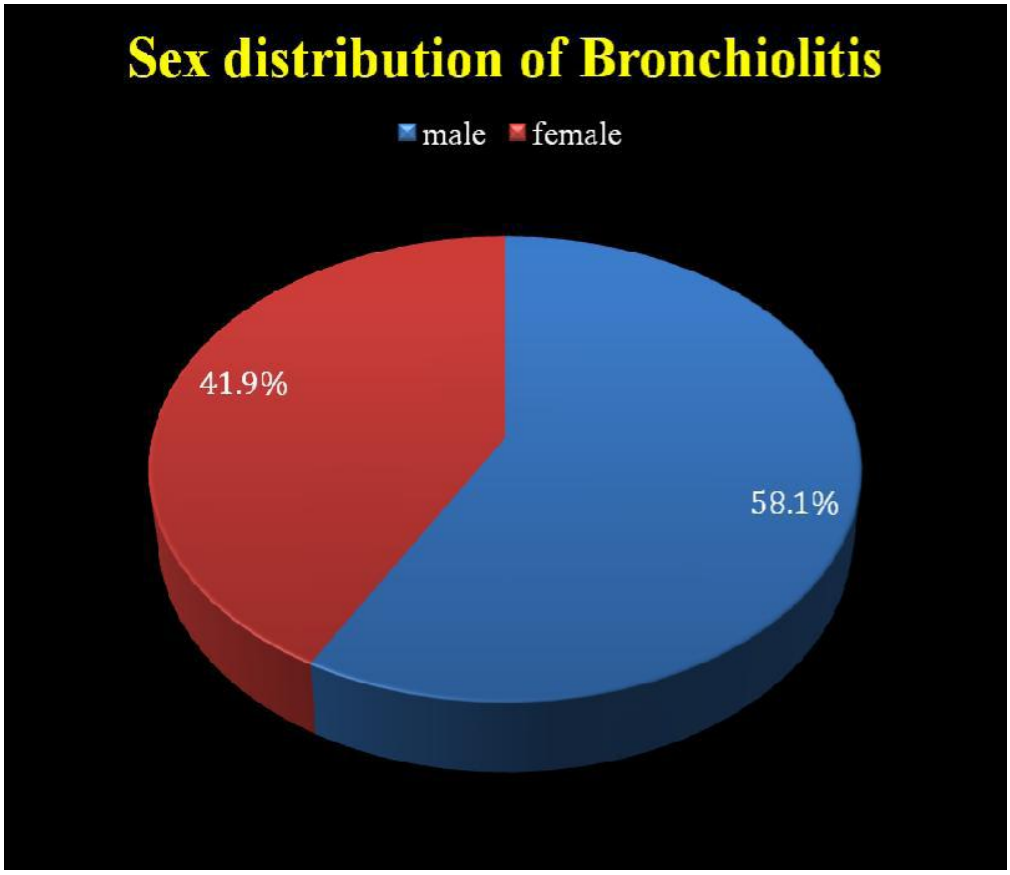

Sex distribution of Bronchiolitis
male
female
41.9%
58.1%

Table - III Age wise sex distribution of bronchiolitis

Age (In months)	Male		Female	
	No.	%	No.	%
1 - 6	75	58.1	55	59.2
7 -12	38	29.5	28	30.1
13 -18	13	10.1	7	7.5
19 -24	3	2.3	3	3.2
'P'		**0.001 Significant**		

1 – 12 months age distribution were more in male than female, In rest, sex was equally distributed. This difference is statistically significant.

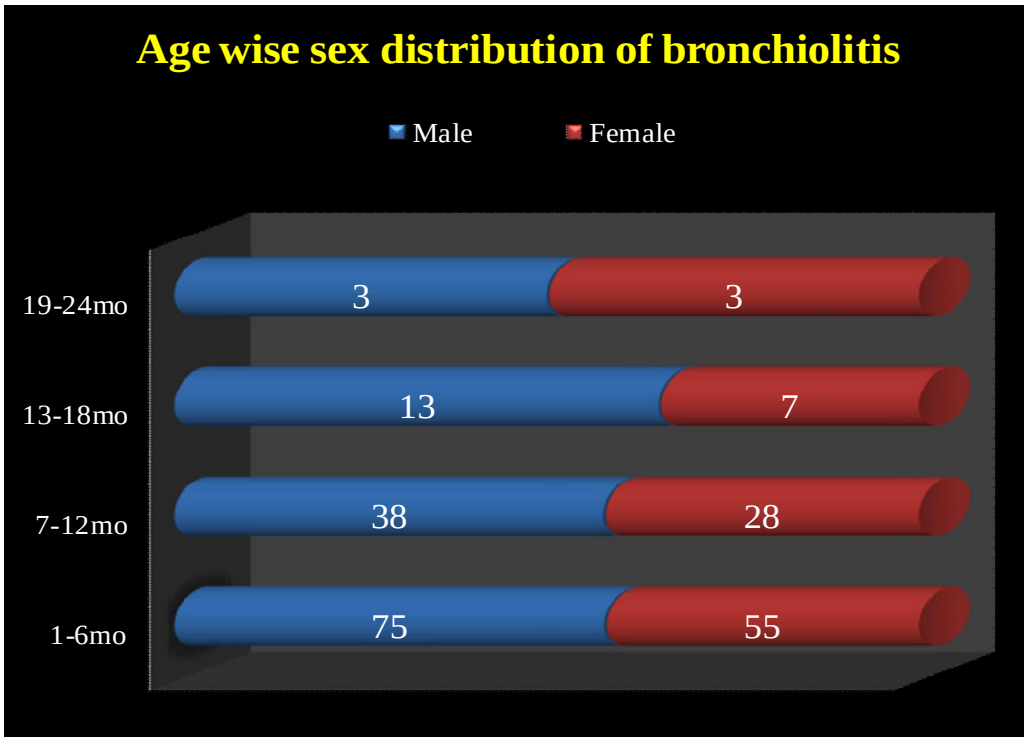

Age wise sex distribution of bronchiolitis
Male
Female
19-24mo
13-18mo
7-12mo
1-6mo
3
3
13
7
38
28
75
55

Table – IV Seasonal Pattern of bronchiolitis

Month - Year	No	%
Aug-09	11	4.9
Sep-09	7	3.1
Oct-09	10	4.5
Nov-09	32	14.4
Dec-09	49	22.1
Jan-10	20	9.1
Feb-10	12	5.5
Mar-10	8	3.7
Apr-10	7	3.1
May-10	5	2.2
Jun-10	7	3.1
Jul-10	18	8.1
Aug-10	36	16.2
Total	222	100

Bronchiolitis admissions were more commonly occurred in December (49) and November (32) followed by January (20) and February (12).

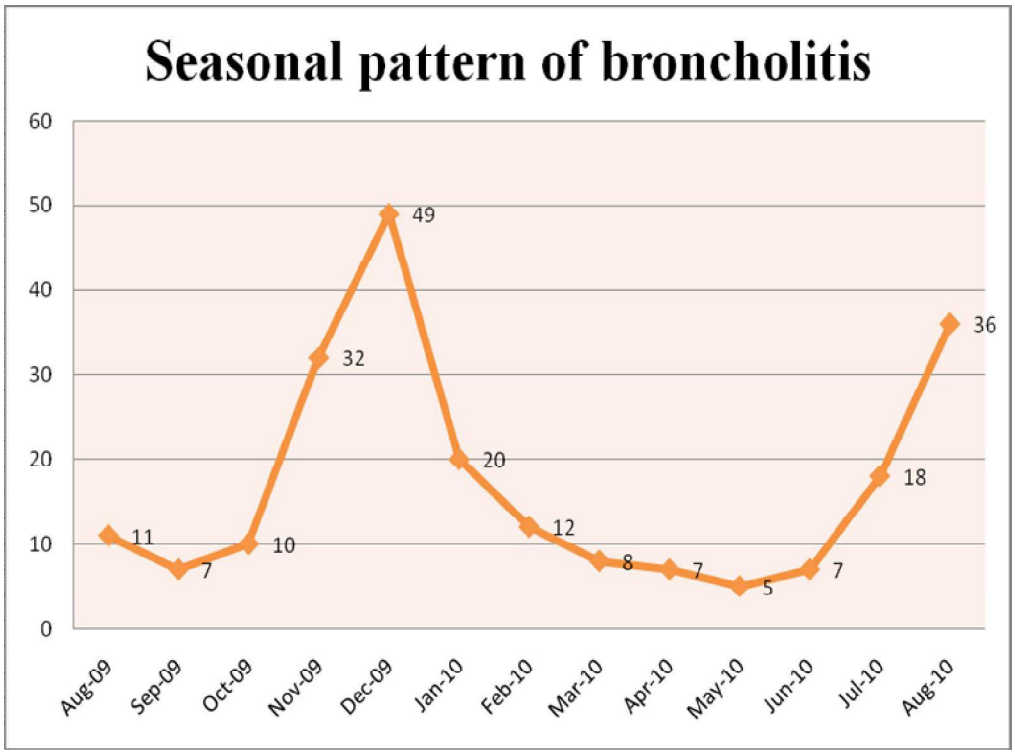

Seasonal pattern of broncholitis
60
50
40
30
20
10
0
11
7
10
32
49
20
12
8
7
5
7
18
36
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Aug-10

Table - V Severity of bronchiolitis

Severity	Children	
	No.	**%**
Mild	90	40.6
Moderate	88	39.6
Severe	44	19.8
Total	222	100

40.6% (90) of children were mild cases.

39.6% (88) of children were moderate cases.

19.8% (44) of children were severe cases

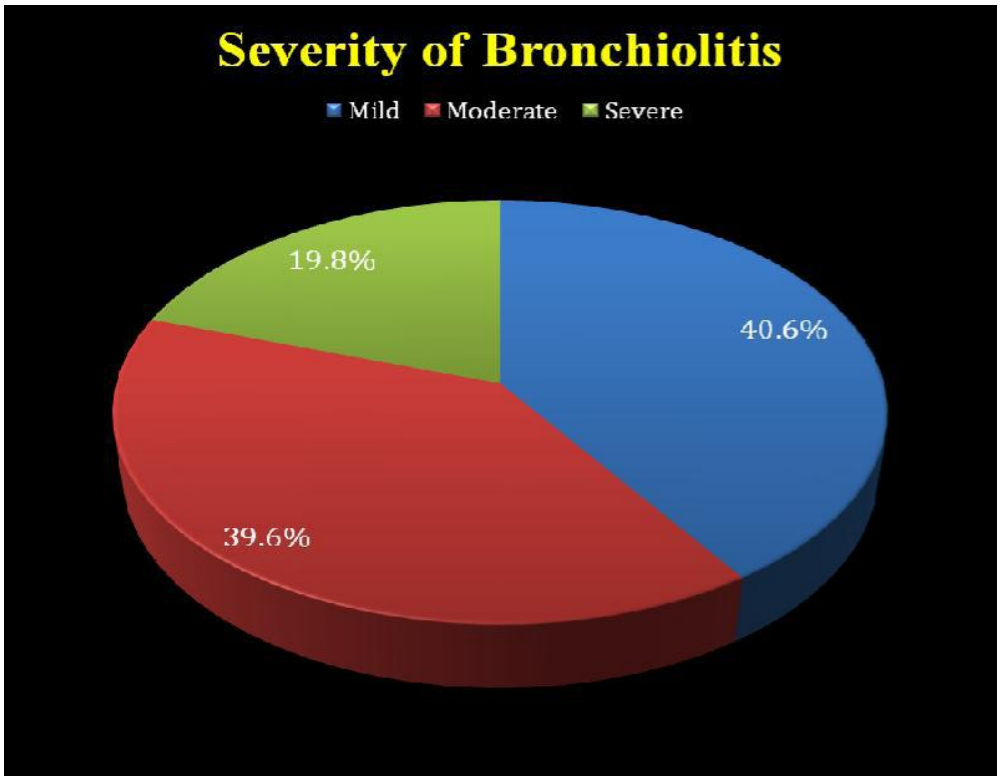

Severity of Bronchiolitis
Mild
Moderate
Severe
19.8%
40.6%
39.6%

Table – VI Severity of bronchiolitis among different age groups

Age (In months)	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
1 – 6	41	45.6	57	64.8	32	72.7
7 – 12	33	36.7	22	25.0	11	25.0
13 -18	13	14.4	6	6.8	1	2.3
19 -24	3	3.3	3	3.4	o	0.0
'P'	**0.03 Significant**					

Severity was more among 1-6 mo age groups, afterwards severity decreases with increasing age. There exists statistically significant relationship between age and severity.

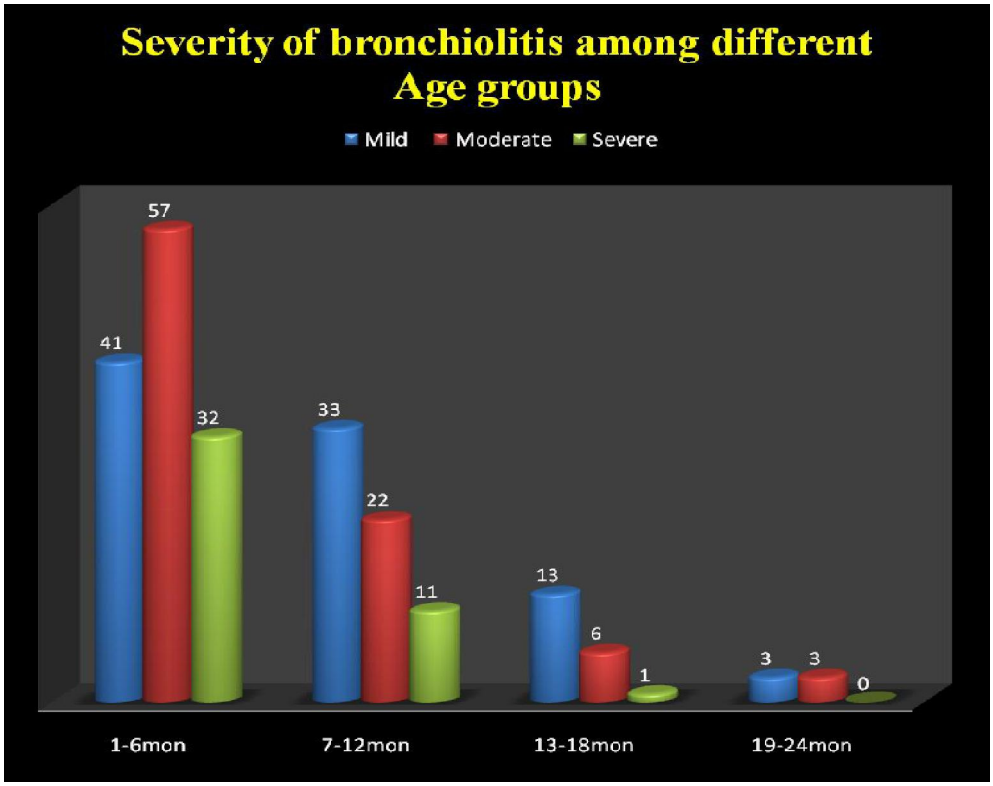

Severity of bronchiolitis among different Age groups
Mild
Moderate
Severe
41
57
32
33
22
11
13
6
1
3
3
0
1-6mon
7-12mon
13-18mon
19-24mon

Table VII Sex Vs Severity of bronchiolitis

Sex	Mild		Moderate		Severe	
	No.	**%**	**No.**	**%**	**No.**	**%**
Male	58	64.4	47	53.4	24	54.5
Female	32	35.6	41	46.6	20	45.5
'P'			**0.29 Not Significant**			

Sex of the children does not have statistical significant with severity of the bronchiolitis.

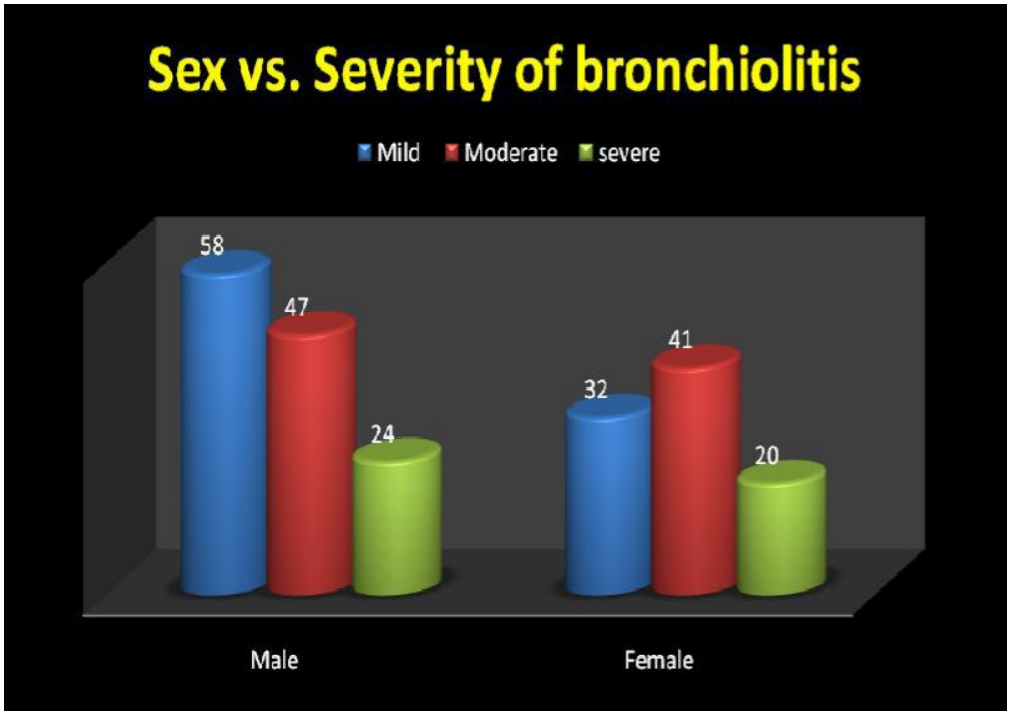

Sex vs. Severity of bronchiolitis
Mild
Moderate
severe
58
47
24
32
41
20
Male
Female

Table VIII Symptoms of bronchiolitis in different age groups

A) Irritable cry among different age groups

Age (in months)	**Irritable cry**			
	Yes		**No**	
	No.	**%**	**No.**	**%**
1-6	92	75.4	38	38.0
7-12	28	23.0	38	38.0
13-18	2	1.6	18	18.0
19-24	0	0.0	6	6.0
'P'		**0.0001 Significant**		

Irritable cry was most commonly presented by 1-6 months of age (75.4 %) followed by 7-12 months of age (23.0%). This is doing statistically significant.

B) Poor feeding among different age groups

Age (in months)	Poor feeding			
	Yes		No	
	No.	%	No.	%
1-6	96	72.7	34	37.8
7-12	30	22.8	36	40.0
13-18	4	3.0	16	17.8
19-24	2	1.5	4	4.4
'P'	**0.0001 Significant**			

72.7% (96) of children belonging to 1-6 months of age group were commonly presented with poor feeding followed by 22.8% of children belonging to 7-12 months of age group. This is doing statistically significant.

C) Aspiration while feeding among different age groups

Age (in months)	Aspiration while feeding			
	Yes		No	
	No.	%	No.	%
1-6	48	75.0	82	51.9
7-12	15	23.4	51	32.3
13-18	1	1.6	19	12.0
19-24	0	0.0	6	3.8
'P'	**0.0001 Significant**			

Aspiration while feeding (98.4%) was more commonly presented by age group of 1-12months than rest. This relationship is doing statistically significant.

Table -IX Symptoms presentation Vs Severity of bronchiolitis

A) Irritable cry vs. severity of bronchiolitis

Irritable cry	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
Yes	32	35.6	55	62.5	35	79.5
No	58	64.4	33	37.5	9	20.5
'P'	0.001 Significant					

B) Poor feeding vs. Severity of bronchiolitis

Poor feeding	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
Yes	40	44.4	55	62.5	36	81.8
No	50	55.6	33	37.5	8	18.2
'P'	0.001 Significant					

C) Aspiration while feeding vs. severity of bronchiolitis

Aspiration while feeding	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
Yes	6	6.7	21	23.9	37	84.1
No	84	93.3	67	76.1	7	15.9
'P'	0.004 Significant					

These symptoms (irritable cry, poor feeding and aspiration while feeding) were significantly predicting the severity of the bronchiolitis.

Table X <u>Birth Weight Vs Severity of bronchiolitis</u>

Severity	**Birth Weight(in Kg)**			
	<2.5		**>2.5**	
	No.	%	No.	%
Mild	21	24.4	69	50.7
Moderate	41	47.7	47	34.6
Severe	24	27.9	20	14.7
'P'	**0.0003 Significant**			

Children with LBW had more severe presentation of the bronchiolitis than children with birth weight >2.5kg.

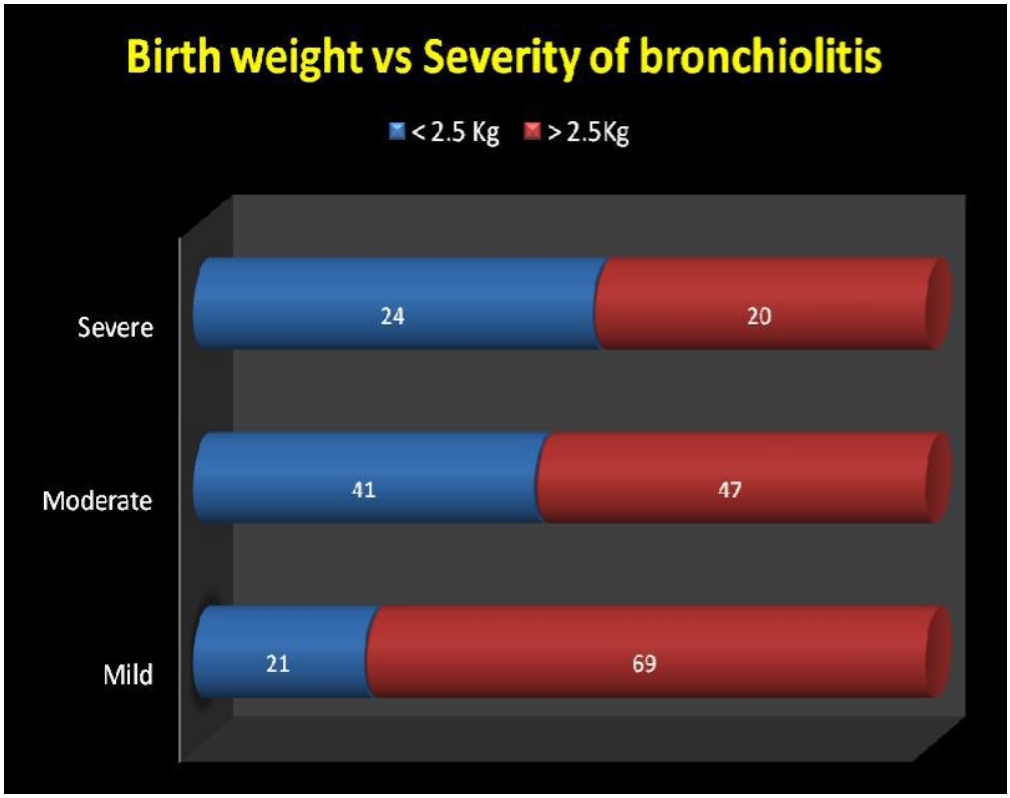

Birth weight vs Severity of bronchiolitis
< 2.5 Kg
> 2.5Kg
Severe
Moderate
Mild
24
20
41
47
21
69

Table XI Exclusive Breast Feeding Vs Severity of bronchiolitis

EBF	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
Yes	43	47.8	43	48.9	7	15.9
No	47	52.2	45	51.1	37	84.1
'P'	**0.001 Significant**					

Children who were exclusively breast fed presented with lesser severity. Very high significant exist between the two variables.

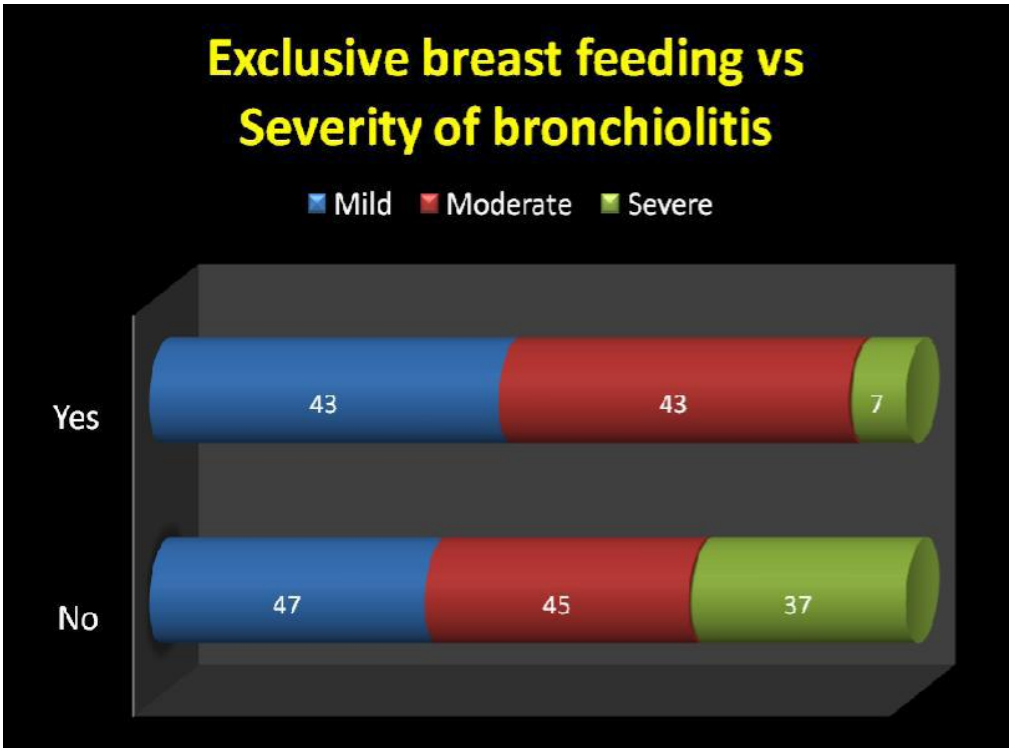

Exclusive breast feeding vs
Severity of bronchiolitis
Mild
Moderate
Severe
Yes
No
43
43
7
47
45
37

Table XII Bottle Feeding Vs Severity of bronchiolitis

Bottle Feeding	Mild		Moderate		Severe	
	No.	**%**	**No.**	**%**	**No.**	**%**
Yes	56	62.2	47	55.4	35	79.5
No	34	37.8	41	46.6	9	20.5
'P'	**0.01 Significant**					

Bottle feeding increases the severity of the disease. This relationship is statistically significant.

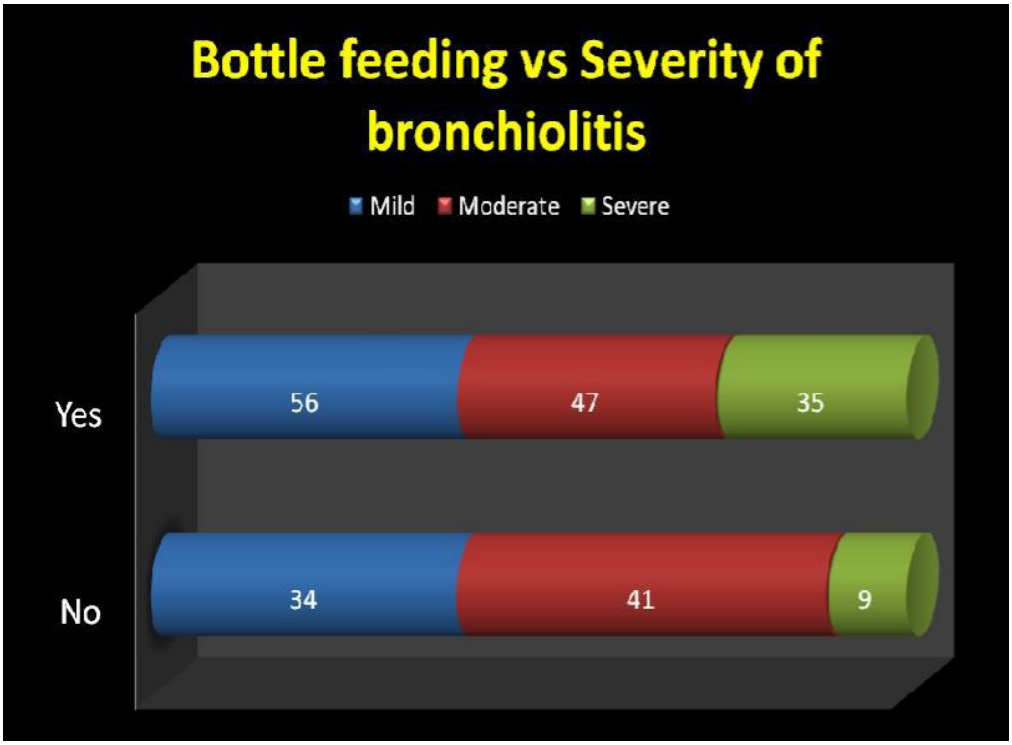

Bottle feeding vs Severity of bronchiolitis
Mild
Moderate
Severe
Yes
No
56
47
35
34
41
9

Table XIII Parental Asthma Vs Severity of bronchiolitis

Parental Asthma	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
Yes	19	21.1	22	25.0	12	27.3
No	71	78.9	66	75.0	32	72.7
'P'	0.69 Not Significant					

There is no significant relationship between these two variables.

Table XIV Passive Smoking Vs Severity

Parental Asthma	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
Yes	33	36.7	42	47.7	27	61.4
No	57	63.3	46	52.3	17	38.6
'P'	0.02 Significant					

Severity of the bronchiolitis was more among the children exposed to passive smoking than not exposed. This relationship is statistically significant.

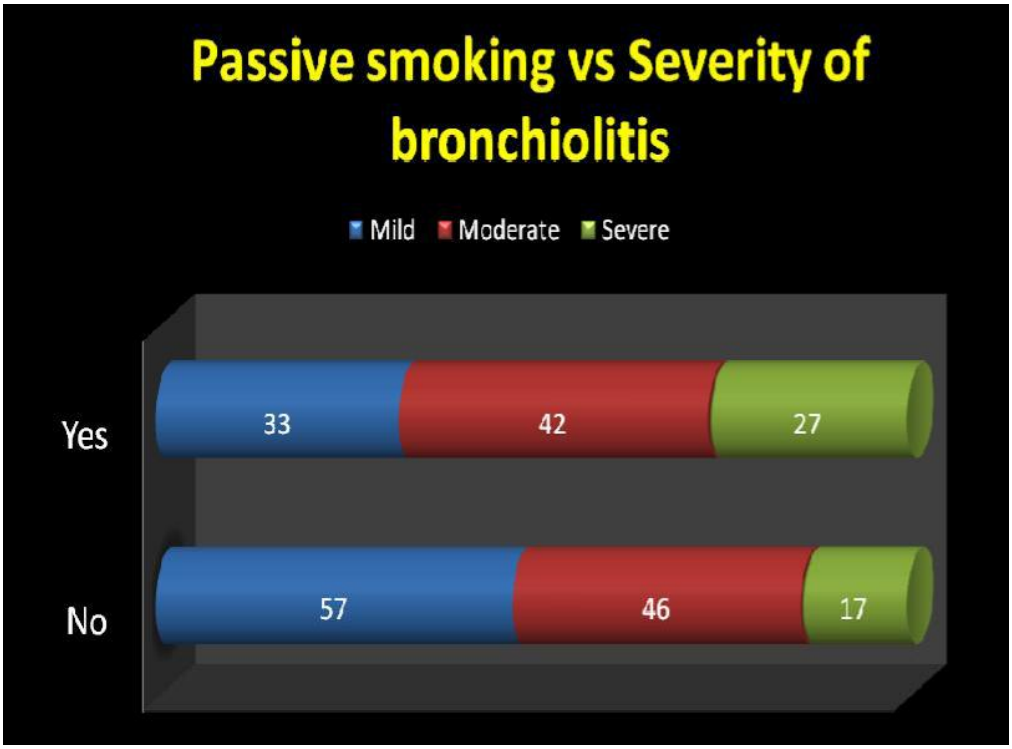

Passive smoking vs Severity of bronchiolitis
Mild
Moderate
Severe
Yes
No
33
42
27
57
46
17

Table XV Indoor Allergens Vs Severity of bronchiolitis

Severity	Indoor Allergens			
	Yes		No	
	No.	%	No.	%
Mild	20	26.3	70	47.9
Moderate	38	50.0	50	34.3
Severe	18	23.7	26	17.8
'P'	**0.001 Significant**			

When the children exposed to the indoor allergens presented with severe bronchiolitis. There is a significant relationship between indoor allergens and severity of the bronchiolitis.

Table XVI Age at risk for bronchiolitis when exposure to URI in family members

Age (in months)	URI in family members			
	Yes		No	
	No.	%	No.	%
1-6	86	63.3	44	51.1
7-12	41	30.1	29	29.1
13-18	7	5.1	13	15.1
19-24	2	1.5	4	4.7
'P'		**0.02 Significant**		

1-6months age groups (63.3%) were prone to have a disease than the rest of the age groups. There is a significant difference between two variables.

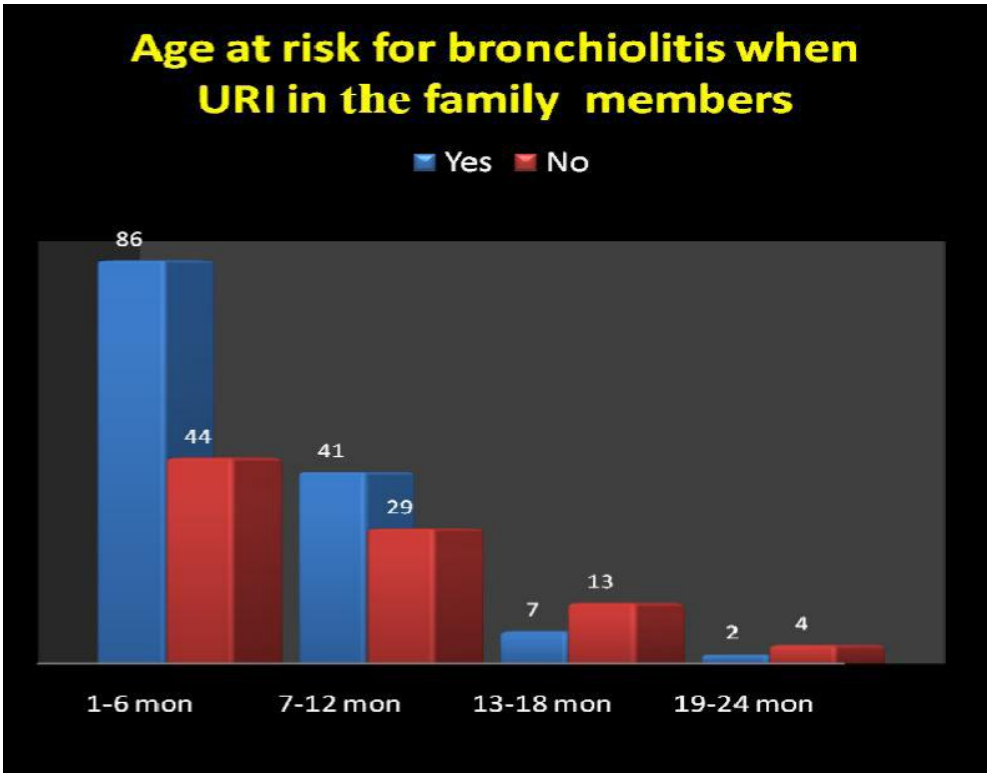

Age at risk for bronchiolitis when URI in the family members
Yes
No
86
44
41
29
7
13
2
4
1-6 mon
7-12 mon
13-18 mon
19-24 mon

Table XVII Type of family VS Severity of bronchiolitis

Type of family	Mild		Moderate		Severe	
	No.	**%**	**No.**	**%**	**No.**	**%**
Joint	33	36.7	46	52.3	27	61.4
Nuclear	57	63.3	42	47.7	17	38.6
'P'	**0.02 Significant**					

Children residing in joint family were presented with more severe disease than nuclear family. This relationship is statistically significant.

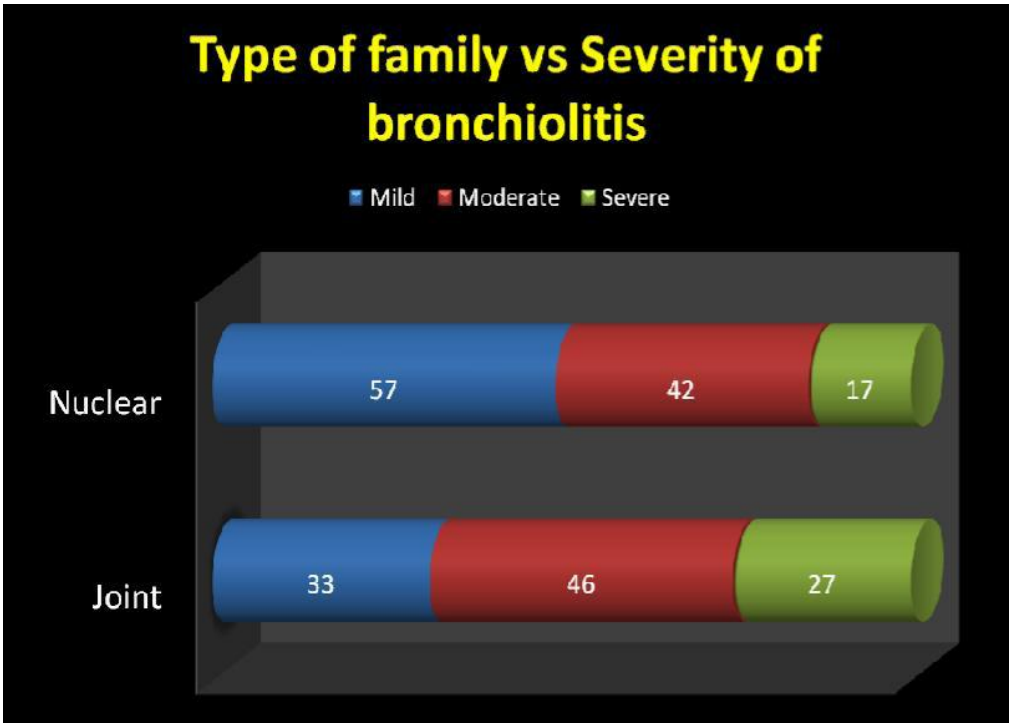

Type of family vs Severity of bronchiolitis
Mild
Moderate
Severe
Nuclear
57
42
17
Joint
33
46
27

Table XVIII No. of children Vs Severity of bronchiolitis

No. of Children	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
1	38	42.2.	31	23.6	12	27.3
2	29	32.2	32	36.4	10	22.7
>2	23	25.6	35	36.8	22	50.0
'P'	**0.02 Significant**					

As the birth order increases presentation of the disease was severe.

This relationship is statistically significant.

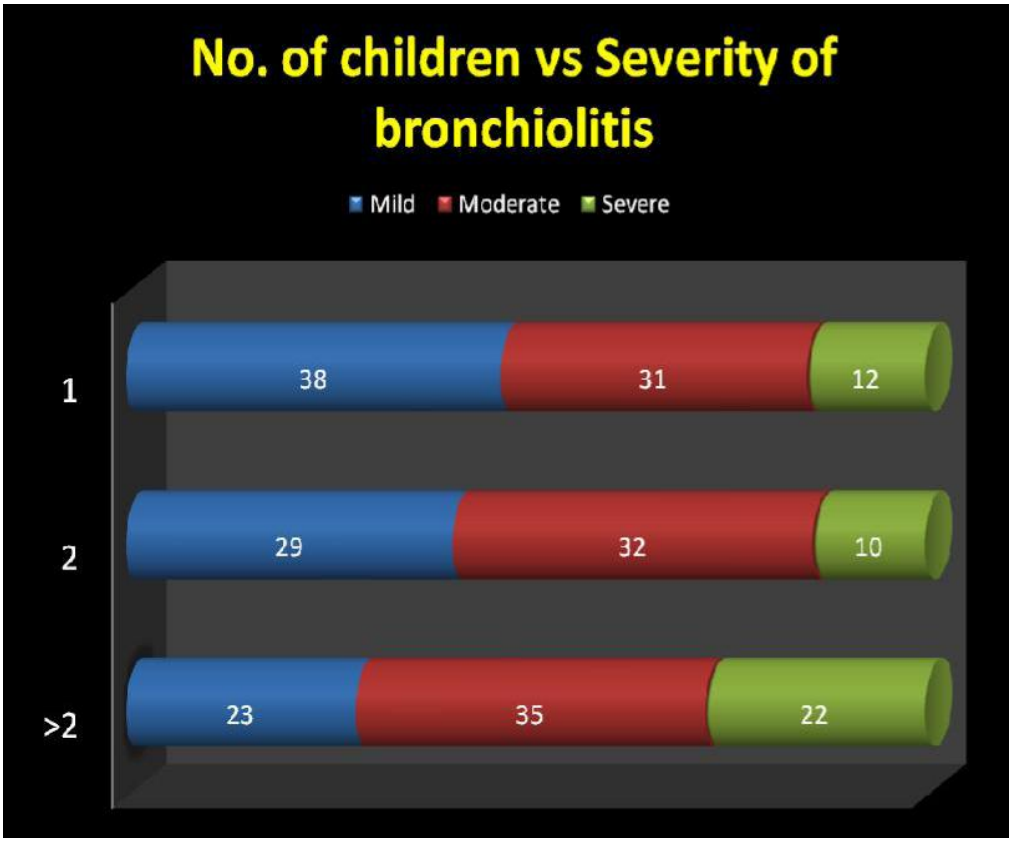

No. of children vs Severity of bronchiolitis
Mild
Moderate
Severe
1
38
31
12
2
29
32
10
>2
23
35
22

Table XIX SES Vs Severity of bronchiolitis

SES	Mild		Moderate		Severe	
	No.	**%**	**No.**	**%**	**No.**	**%**
Class I	-	-	-	-	-	-
Class II	3	100	-	-	-	-
Class III	37	52.1	28	39.4	6	8.5
Class IV	45	34.9	52	40.3	32	24.8
Class V	5	26.3	8	42.1	6	31.6
'P'	**0.01 Significant**					

Majority of the severe presentation of bronchiolitis was belonged to Class IV Socio Economic Status (72.8%) followed by Class III & V (13.6).

SES Vs Severity of bronchiolitis

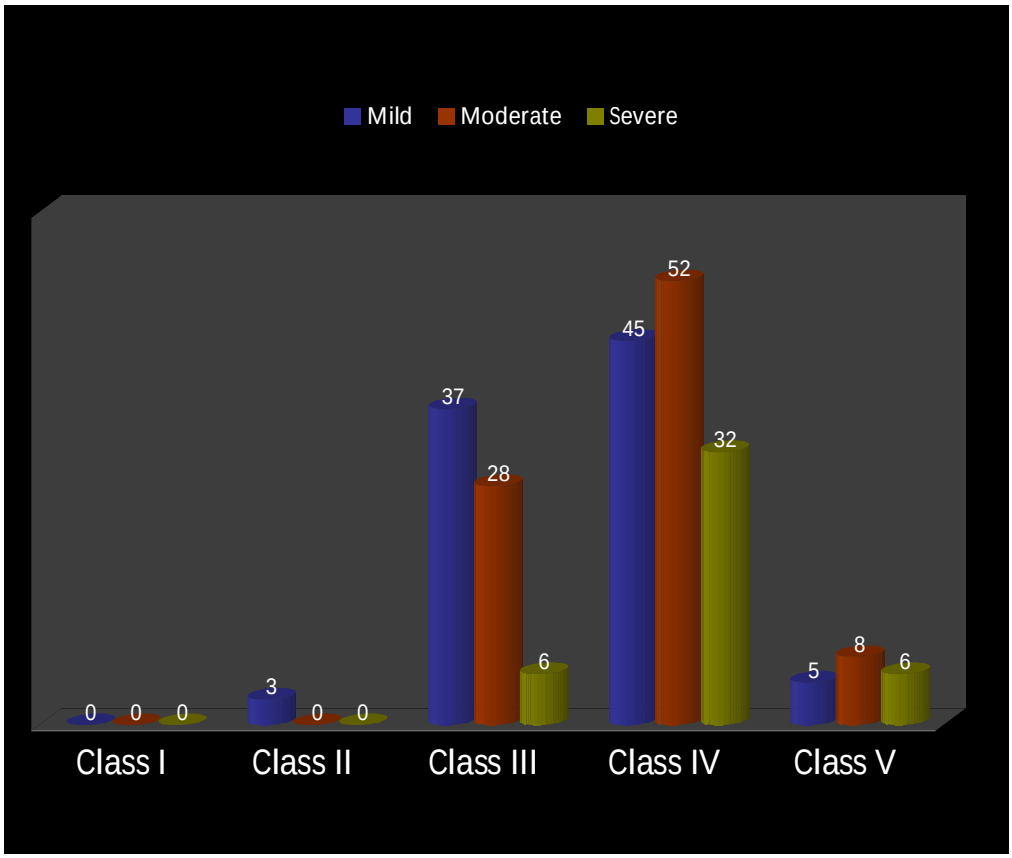


Table XX Oxygen requirement VS Severity of bronchiolitis

Oxygen requirement	Mild		Moderate		Severe	
	No.	**%**	**No.**	**%**	**No.**	**%**
<72HRS	83	98.9	31	35.2	0	0.0
>72HRS	7	1.1	57	64.8	44	100.0
'P'	**0.001 Significant**					

In our study we found that average duration of O2 supplementation was 2.36days. Severe cases were needed prolonged oxygen requirement. There exists statistically significant relationship between severity and oxygen requirement.

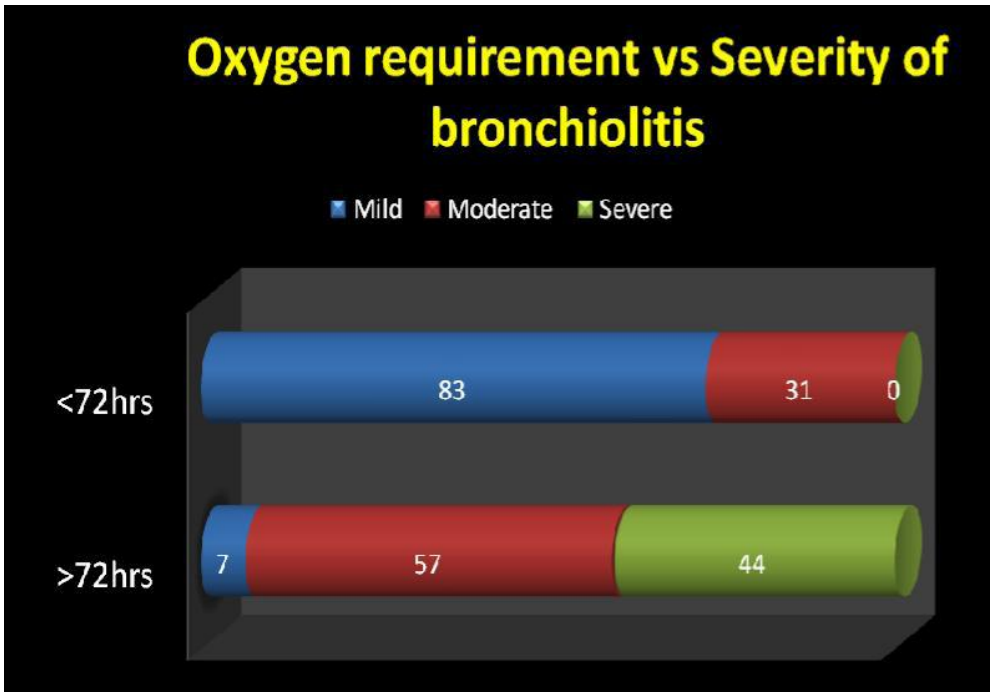
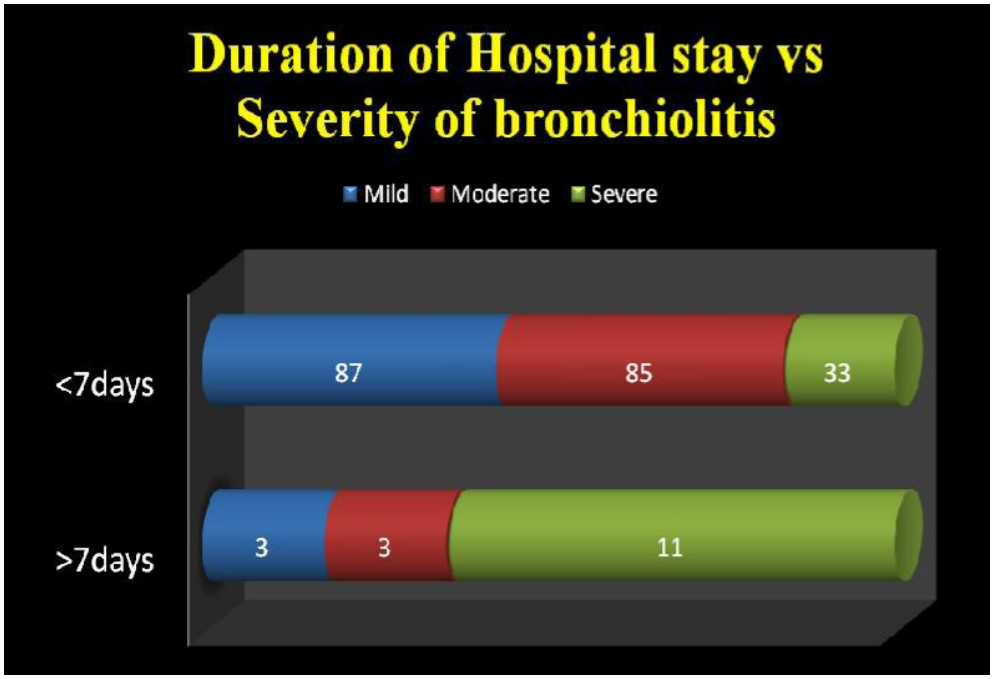

Oxygen requirement vs Severity of bronchiolitis
Mild
Moderate
Severe
<72hrs
>72hrs
83
31
0
7
57
44

Table XXI Duration of Hospital stay Vs severity of bronchiolitis

Duration of Hospital stay	Mild		Moderate		Severe	
	No.	%	No.	%	No.	%
<7days	87	96.7%	85	96.6%	33	75.0%
>7days	3	3.3%	3	3.4%	11	25.0%
'P'	0.001 Significant					

In our study, median duration of hospital stay was 4 days. Severe cases of bronchiolitis needed prolonged stay in hospital than mild and moderate cases which is statistically significant.


Duration of Hospital stay vs Severity of bronchiolitis
Mild
Moderate
Severe
<7days
87
85
33
>7days
3
3
11

DISCUSSION

DISCUSSION

Joseph L Mathew et al[67], he mentioned that bronchiolitis is regarded as the most common LRTI among infants in developed countries. In our country too, it is a significant problem judging by the frequency of wheezing episode among young infants.

Age distribution of bronchiolitis

In our study, 58.6% were 1 -6mon age groups, 29.7% were 7–12mon age groups, nearly 88.3% (196) were belonged to 1 – 12mon age groups which was similar to studies done by Caroline Breese Hall et al[8] and Uyan et al[26], in their studies 85% of children belonged to less than 12months.

One study from U. K.[68] 63.6% was less than 6 months, 92.8% were less than 12 months, and this study was on populations under 2 years of age.

In our study, 11.7% of children were 12 – 24 months of age which was similar to study from Greece[69], found that only 10 % of study population were above 12 months of age. P. Flores et al[63], 10.6% were belonged to 12 – 24 months of age.

In our study, mean age was 6.4 months. In Uyan et al[26], mean age was 6.9 months which was similar to our study. Other studies by Arif A et al[27] and Iqbal et al[25] reported the mean age was 5.43 months and 11.5 months respectively. A.G. Constantopoulos et al[69], mean age was 5. 98 months. R.Y.T. Sungi et al[6] was reported the mean age was 5 months.

These findings are explained that bronchiolitis was most commonly presented by 5 to 7 months of age groups.

Sex distribution of bronchiolitis

In our study we observed that male (58.1%) predominance which is in agreement with reports from other parts of the world[26, 6]. They observed male predominance of 58% in their study.

Male predominance was significantly noted below 12 months of age groups in our study; in rest sex was equally distributed.

Seasonal Pattern of bronchiolitis

In our study, most cases were admitted between November and March which means outbreak of bronchiolitis most likely occurs in winter and early spring which was similar to studies done in west.

AAP[1] stated that in their guideline, the highest incidence of RSV occurring between December and March. Hans-Olav Fjaerli et al[7] done

a population based retrospective study in Northern Europe; he reported that the high number of admission was recorded during winter months December – April.

John et al9 done a study in South India, he stated that acute bronchiolitis tented to occur in outbreaks between August and November.

In Hong Kong, R.Y.T.Sungi et al[6] in his study, he surprised to find that acute bronchiolitis was prevalent in the middle part of the year, between April and October. One study from U.K.[68] clearly stated that the majority of admission (93.8%) occurred between months of November and March each year.

Symptoms presentation of bronchiolitis

Our study populations were hospitalized children who invariably (100%) presented with respiratory distress. Irritable cry (98.4%), poor feeding (95.5%) and aspiration while feeding (98.4%) were more commonly presented by age group of 1-12months. These symptoms were significant with severe clinical presentation of disease (P= 0.0001).

Iqbal et al[25], he studied among age group between 2months to 2years, he found that 91% had respiratory distress at the time of presentation and 32% had decreased feeding. Study conducted by Arif A

et al[36] concluded that respiratory distress (97.5%) was consistent clinical feature. The results of our study are also consistent with previous studies where authors found that respiratory distress was the main presenting feature of acute bronchiolitis.

Study from U.K.[31], concluded that the frequency of swallowing was slightly higher, the volume of milk consumed per swallow was almost half the amount consumed by the comparison group. Coordination of breathing with swallowing was also less effective which explains the symptom presentation of poor feeding in younger age groups.

Severe disease: signs and symptoms associated with **poor feeding** and respiratory distress characterized by tachypnea, nasal flaring, and hypoxemia said by the AAP[1]. Aspiration is likely to play a role when rapid deterioration occurs in infants with RSV bronchiolitis[33].

There is a conflicting finding by A. Maffey et al[32], his study was the risk of aspiration in bronchiolitis in hospitalized infants. He studied on only 15 infants; he found that there was a no risk of aspiration during acute bronchiolitis.

Analysis of Severity among identified risk factors

In our study population, 40.6 %(90) were mild cases, 39.6 %(88) were moderate cases and 19.8 % (44) were severe cases which was assessed by woods downes scores.

Severity among different age groups

Young age remains the most important predictor for severe bronchiolitis said by AAP[1]. This was shown by our study that 97.7% of children among 1 – 12mon age group were presented with severe presentation. Caroline Breese Hall et al[8] evaluated risk factor for severe disease; he concluded that only young age imposed a significantly greater risk for severe illness among children with RSV infection. Young age especially less than 3 months was a risk for severe disease[37].

Sex vs. severity of bronchiolitis

In our study we found that sex was not statistically significant with severity of disease. Whereas Eric A.F Simoes et al[40] concluded in his study that male sex was independent risk factor for the severe bronchiolitis.

Birth weight vs. Severity of bronchiolitis

We studied on Term babies with low birth weight; we demonstrated that the low birth weight was predicting risk and the severity of the disease which was proved by the study done by Carroll et al[48], in his population based retrospective study on 103 670 term, he found that analysis of the linear trend for birth weight in 500-g increments demonstrated a significant negative association with bronchiolitis risk for hospitalization which was indirectly reflecting the severity of the disease.

Study from U.S.[70]concluded although infants weighing <2500g at birth are at increased risk for dying with bronchiolitis, the majority of bronchiolitis deaths occur among infants of normal birth weight.

Type of feeding practice vs. Severity of bronchiolitis

Our study found that non breast feeding practice was predicting the risk for severity of the disease. The same finding was demonstrated by various studies from all over the world.

Study from India by Das PK et al[45], he was clearly mentioned that non breast feeding practice as significant risk factor for severe bronchiolitis.

M A P S Downham et al[71] concluded in his study that the incidence of breast-feeding among infants admitted to hospital with RSV infection was significantly lower. Therefore breast-feeding seems to offer protection against illness severe enough to require hospital admission even though the occasional occurrence of frank bronchiolitis in fully breast-fed infants makes it clear that this protection is not complete. C R Pullan et al[72] concluded that the breast feeding may be an independent factor influencing the severity of the bronchiolitis.

The conflicting finding with above studies was documented by Eric A.F Simoes et al[40] stated that there was a lack of evidence for non breast feeding practice appear to increase the risk of severe RSV infection. His finding was justified by the study done by Toms et al[72], he has shown that breast milk varies in its anti-respiratory syncytial virus activity which explains that breast-feeding does not give complete protection.

Regardless of the reasons for protection, the strong association between breastfeeding and lack of severe RSV infection suggests that increasing the proportion of mothers who breastfeed their infants could result in substantial disease reduction.

Parental asthma vs. severity of bronchiolitis

In our study parental asthma did not predict the severity of disease significantly. Our result was supported by Carbonell Estrany x et al[73]. But one study[40] demonstrated an association between maternal asthma and less severe hospitalized disease.

Passive smoking vs. severity of bronchiolitis

In the study from China[46] secondhand environmental tobacco smoke exposure early age of life increases the risk for severe respiratory illness like bronchiolitis. The same result was demonstrated in our study. Bryn H Salt et al[50] concluded that SHS exposure may increase the severity of bronchiolitis in RSV-infected infants.

In a more recent nested case control study from the Danish birth cohort[49] clearly stated that tobacco smoke exposure was shown to be unequivocally associated with an increased risk for severe RSV bronchiolitis leading to hospitalization.

Indoor allergen vs. severity of bronchiolitis

In our study we found out that those who were exposure to indoor allergen were having severe clinical presentation of bronchiolitis.

One study on developing countries concluded that indoor air pollution in households using biomass fuels, the risk seems to be fairly strong, presumably because of the high daily concentrations of pollutants found in such settings and the large amount of time young children spend with their mothers doing household cooking[18].

Karen Morris et al[74] in his study he analyzed that wood-burning stove use and respiratory illness exposure were independently associated with higher risk for severe disease. Cooking with wood-burning stoves was associated with higher indoor air concentrations of respirable particles which contributed for the severity of the disease which explains our study result[75].

Type of family vs. severity of bronchiolitis

The children from joint family were presented with severe form of the disease than nuclear family which indirectly explained the overcrowding which was supported by previous studies[40, 51.]

No of children in the family vs. severity of bronchiolitis

Our study result was consistent with Holman RC et al[70], he stated that in his study that increasing birth order was a risk factor for severity of bronchiolitis.

One study from Italy[76], concluded that the only condition related to demographic and social characteristic of the family was the number of children in the family (being at least the second baby was a risk factor) which was a risk factor for severe illness. The severity of disease was associated with increasing number of sibling in the family[48].

SES vs. Severity of bronchiolitis

In our study, we found that lower socio-economic status were presented with severe disease than higher socio-economic status which explain that low SES peoples living with over crowing, poor ventilation and high birth order.

Lower socio-economic status children were frequently presented by severe illness[8]. Otherwise healthy, term infants who require hospitalization were lower income population[48].

Duration of oxygen requirement & Hospital stay

Christrophe Merguet et al, he studied on under one year age needed the oxygen supplementation was one day. One study from Italy by Paolo Di Carlo et al[110] documented the duration of oxygen requirement was 4.9days. In our study we found that average duration of O2 supplementation was 2.36days.

Hans-Olav Fjaerli et al[7] found that median length of stay was 4 days which was similar to our study. Caroline Breese Hall et al[8] in his study, median hospitalization was 2 days, the same finding was documented by S A Despande et al[94].

We also documented that duration of O2 requirement and duration of hospital stay were statistically associated with severity of the disease i.e. prolonged need for O2 and prolonged duration of hospital stay were presented with very severe illness.

Conclusion

CONCLUSION

- In our study, we concluded that bronchiolitis occurred more commonly in 1-12months of age group with male predominance and most cases occurred in the winter and early spring.
- Mild and moderate severity was the common presentation in our study. 1-6months age group presented with severe form of bronchiolitis.
- Irritable cry, poor feeding and aspiration while feeding were more common presentation for the age group of 1-12months and these symptoms were significantly predicting the severity.
- Children with LBW, not exclusively breast feed, bottle feed, exposed to passive smoking and indoor allergens (wood burning stoves and mosquito repellents), children residing in joint family, increasing birth order and low Socio Economic Status were significantly associated with severity of the bronchiolitis.
- Sex and parental asthma were not significantly predicting the severity of the bronchiolitis.

- Family members with URI were spreading the infection to the younger age group (1-6months).
- Average duration of O2 supplementation was 2.36days. Median duration of hospital stay was 4 days.
- Severe cases needed prolonged oxygen supplementation and prolonged hospital stay which is significant.

LIMITATIONS AND RECOMMENDATIONS

LIMITATIONS

- Severity of bronchiolitis in this study was assessed by descriptive study, hence relative risk could not be assessed.
- We studied on inpatients excluding preterm, CHD, underlying respiratory illness and immunodeficiency. We could not estimate the incidence of hospitalization.

RECOMMENDATIONS

- Wash hands frequently to prevent spreading of the infection.
- Keep children away from secondhand smoke.
- Keep children (especially younger than 6months) away from other people with acute respiratory tract infections.
- Encourage the mother to give exclusive breast fed.
- Avoid bottle feeding to prevent hospitalization for bronchiolitis.
- Avoid using the wood burning stoves and mosquitoe coils.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. American Academy of Pediatrics, Subcommittee on Diagnosis and Management of Bronchiolitis. Pediatrics. 2006; 118(4): 1774 – 1793

2. Jeffrey A. et al. Bronchiolitis: An Evidence-Based Approach to Management. Clinical Pediatric Emergency Medicine (June 2009), 10 (2), pg. 75-81.

3. Hubble D, Osborn GR. Acute bronchiolitis in children. Br Med J 1941; 1:107-10.

4. Lakhanpaul M, Armon K, et al. An Evidence Based Guideline for the Management of Children Presenting With Acute Breathing Difficulty. Nottingham, United Kingdom: University of Nottingham; 2002.

5. Scottish Intercollegiate Guidelines Network (SIGN). Bronchiolitis in Children. (A national clinical guideline.) 2006. www.sign.ac.uk.

6. Sung RYT, Chan RCK, Tam JS et al. Epidemiology and etiology of acute bronchiolitis in Hong Kong infants. Epidemiology and Infection 108: 147-154, 1992.

7. Hans-Olav Fjaerli et al. Hospitalizations for respiratory syncytial virus bronchiolitis in Akershus, Norway, 1993–2000: a population-based retrospective study BMC Pediatrics 2004, 4:25doi:10.1186/1471-2431-4-25

8. Joseph J. Zorc, MD, MSCE, Caroline Breese Hall, MD Bronchiolitis: Recent Evidence on Diagnosis and Management Pediatrics Vol. 125 No. 2 February 2010, pp. 342-349

9. John TJ et al. Bronchiolitis in tropical South India. Am J Dis Child. 1990 Sep; 144(9):1026-30.

10. Borrero I, Fajardo L, et al.(1990) Acute respiratory tract infections among a birth cohort of children from Cali, Colombia, who were studied through 17 months of age. Reviews of Infectious Diseases 12 (Suppl. 8) S950–S956.

11. Dagan R and Landau D et al (1993) Hospitalization of Jewish and Bedouin infants in southern Israel for bronchiolitis caused by respiratory syncytial virus. Pediatric Infectious Disease Journal 12, 381–386

12. Holberg CJ, Wright AL, et al. Risk factors for respiratory syncytial virus-associated lower respiratory illnesses in the first year of life. Am J Epidemiol. 1991; 133 (11):1135 –1151

13. Boivin G, De Serres G, Coˆ te´ S, et al. Human Metapneumovirus infections in hospitalized children. Emerg Infect Dis. 2003; 9(6): 634–640

14. C, Shears P, Smyth RL, Hart CA: Dual infection of infants by human Metapneumovirus and human respiratory syncytial virus is strongly associated with severe bronchiolitis. J Infect Dis 2005, 191:382-386.

15. Charanjit Kaur et al. Respiratory Viruses in Acute Bronchiolitis in Delhi. Indian Pediatrics Volume 47: April 17, 2010.

16. Rakes GP, Arruda E, Ingram JM, et al. Rhinovirus and respiratory syncytial virus in wheezing children requiring emergency care. IgE and eosinophil analyses. Am J Respir Crit Care Med. 1999; 159(3):785–90.

17. McIntosh K et al. Pathogenesis of severe acute respiratory infections in the developing world: Respiratory syncytial virus and parainfluenza viruses. Rev Infect Dis 1991; 13 (suppl 6):492-500

18. Smith JJ, Lemen RJ, Tausig LM. Mechanisms of viral induced lower airway obstruction. Pediatr Infect Dis J 1987; 6:837-842.

19. Gardner PS, McQuillin J, Court SDM. Speculation on pathogenesis in death from respiratory syncytial virus infection. Br Med J 1970; 1:327-330.

20. Casale TB. Neuropeptides and the lung. J Allergy Clin Immunol 1991; 88:1-14.

21. Santangelo G, Giannotti G, Amato C. Studio quantitativo delle sottopopolazioni T nei soggetti affetti da bronchiolite. Boll Ist Sieroter Milan 1988; 2:156-158.

22. Mito K, Chiba Y, Suga K, Nakao T. Cellular immune response to infection with respiratory syncytial virus and influence of breast-feeding on response. J Med Virol 1984; 14:323-332.

23. Bruhn FW, Yeager AS. Respiratory syncytial virus in early infancy. Circulating antibody and severity of infection. Am J Dis Child 1977; 131:145-148.

24. Glezen WP, Paredes A, Allison JE, Taber LH, Frank AL. Risk of respiratory syncytial virus infection from low income families in

relationship to age, sex, ethnic group and maternal antibody level. J Pediatr 1981; 5:708-715.

25. Iqbal S. M. J., Afzal M. F., Sultan M. A. Acute Bronchiolitis: Epidemiological and Clinical Study**.** Annals Vol 15. NO. 4 OCT. - DEC. 2009**.**

26. Uyan AP, Ozyurek H, Keskin M et al Comparison of two different bronchodilators in the treatment of acute bronchiloitis [online] 2003

27. Arif A et al, Acute bronchiolitis-a clinical study. Pak Ped J 1998; 22: 175-7.

28. Denny FW, Collier AM et al, The epidemiology of bronchiolitis. Pediatr Res 1977; 11: 234-6.

29. De Silva LM, Hanlow MG. Respiratory syncytial virus: A report of a 5-year study at a children's hospital. J Med Virol 1986; 19: 299-305.

30. Weber et al Respiratory syncytial virus infection in tropical and developing countries. Tropical Medicine & International Health. 3(4):268-280, April 1998.,

31. Pinnington L et al. Feeding efficiency and respiratory integration in infants with acute viral bronchiolitis. J Pediatr 2000; 137: 523–526.

32. A. Maffey et al Bronchiolitis – viruses, treatment and outcome. E3019 Risk of aspirationinRSV-bronchiolitishospitalizedinfants, September 2007.

33. Eduardo Hernandez MD, Aspiration: A factor in rapidly deteriorating bronchiolitis in previously healthy infants? Pediatr Pulmonol. 2002; 33:

34. Oski's pediatrics: principles & practice 4th edition By Julia A. McMillan, Ralph D. Feigin, Catherine DeAngelis, M. Douglas Jones Page 1227.

35. McMillan JA, Tristram DA, Weiner LB, et al. Prediction of the duration of hospitalization in patients with respiratory syncytial virus infection: use of clinical parameters. Pediatrics. 1988; 81:22-26.

36. Wang EEL, Law BJ, Boucher FD. Pediatric Investigators Collaborative Network on Infections in Canada (PICNIC) study of admission and management of variation in patients hospitalized

with respiratory syncytial virus lower respiratory tract infection. J Pediatr. 1996; 129:390-395.

37. Shaw KN, Bell LM, Sherman NH. Outpatient assessment of infants with bronchiolitis. Am J Dis Child. 1991;145:151–155.

38. Hall CB, Powell KR, MacDonald NE, et al. Respiratory syncytial viral infection in children with compromised immune function. N Engl J Med. 1986;315:77–81

39. MacDonald NE, Hall CB, et al. Respiratory syncytial viral infection in infants with congenital heart disease. N Engl J Med. 1982;307: 397–400

40. Simo˜ es EA. Environmental and demographic risk factors for respiratory syncytial virus lower respiratory tract disease. J Pediatr. 2003; 143:S118–S126

41. Rossi GA, Medici MC et al. Risk factors for severe RSV-induced lower respiratory tract infection over four consecutive epidemics. Eur J Pediatr. 2007 Dec; 166(12):1267-72. Epub 2007 Feb 17.

42. Rani R, Qazi SA, Rehman GN, Mushtaq A Khan MA. ARI case management in a community. Pakistan Ped J 1995; 19: 9-13.

43. Sznajder M, Stheneur C et al. Respiratory development of 5- to 6-year-old children experiencing a first bronchiolitis episode before age one. Allerg Immunol 2005; 37: 392-6.

44. Vanda Bento, Rita Machado. RSV infection – Risk factors, complications and treatment in two Portuguese hospitals. DOI10.3233/JPI-2010-0222 Pages77-81

45. Das PK, Saha JB, Basu K et al. Some clinico-epidemiological aspect of bronchiolitis among infants and young children--a hospital based study. Indian Journal of Public Health. 2003 Apr-Jun; 47(2): 66-71

46. Chen Y, Wanxian L, Shunzhang Y. Influence of passive smoking on admissions for respiratory illness in early childhood. Br Med J (Clin Res Ed). 1986;293:303–306.

47. Weitzman M, Gortmaker S, Walker DK. Maternal smoking and childhood asthma. Pediatrics. 1990;85:505–511.

48. Carroll, MD, MPHP et al. The Increasing Burden and Risk Factors for Bronchiolitis-related Medical Visits in Infants Enrolled in a State Healthcare Pediatrics. 2008 July; 122(1): 58–64. doi:10.1542/peds.2007-2087.

49. Stensballe LG, Kristensen K, Simo˜ es EA, et al. Atopic disposition,wheezing, and subsequent respiratory syncytial virus hospitalizationin Danish children younger than 18 months: a nested case-control study. Pediatrics. 2006;118(5).

50. Bryn H. Salt MD et al. Effect of secondhand cigarette smoke, RSV bronchiolitis and parental asthma on urinary cysteinyl LTE4†Pediatr Pulmonol. 2008; 43:760–766.

51. Sims DG, Downham MA, McQuillin J, Gardner PS. Respiratory syncytial virus infection in north-east England. Br Med J. 1976 Nov 6;2(6044):1095–1098.

52. Sarfraz T. Acute respiratory infections in children. Pak Armed Forces Med J 1996; 46: 28-32

53. Swingler GH, Hussey GD, Zwarenstein M. Randomised controlled trial of clinical outcome after chest radiograph in ambulatory acute lower-respiratory infection in children. Lancet.1998;351:404–408

54. Bordley WC, Viswanathan M, King VJ, et al. Diagnosis and testing in bronchiolitis: a systematic review. Arch Pediatr Adolesc Med. 2004; 158:119–126.

55. Levine DA, Platt SL, Dayan PS, et al. Risk of serious bacterial infection in young febrile infants with respiratory syncytial virus infections. Pediatrics. 2004; 113:1728–1734.

56. Schroeder AR, Marmor AK, Pantell RH, et al. Impact of pulse oximetry and oxygen therapy on length of stay in bronchiolitis hospitalizations. Arch Pediatr Adolesc Med 2004; 158:527-30.

57. Roback MG, Baskin MN. Failure of oxygen saturation and clinical assessment to predict which patients with bronchioli tis discharged from the emergency department will return requiring admission. Pediatr Emerg Care. 1997; 13:9–11

58. Lucian K. DeNicola, M.D. and Michael O. Gayle, M.D., Bronchiolitis. Jacksonville Medicine / September, 1998. 59. Van Steensel-Moll HA, Hazelzet JA, van der Voort E,et al; Excessive secretion of anti-diuretic hormone in infections with respiratory syncytial virus. Arch Dis Child. 1990;65:1237–1239.

60. Bohe L, Ferrero ME, Cuestas E, Polliotto L, Genoff M. Indications of conventional chest physiotherapy in acute bronchiolitis [in Spanish]. Medicina (B Aires). 2004;64:198–200.

61. Richard W. Newcomb, MD. Use of Adrenergic Bronchodilators by Pediatric Allergists and Pulmonologists Am J Dis Child. 1989; 143(4):481-485.

62. Kimpen JLL, Van Woensel JBM, Wolfs TFW et al. Randomized double blind placebo controlled trial of prednisolone in children admitted to hospital with respiratory syncytial virus bronchiolitis. Thorax. 1997; 52: 634–637.

63. Flores G, Horwitz RI. Efficacy of beta2-agonists in bronchiolitis: a reappraisal and meta-analysis. Pediatrics. 1997; l00: 233–239.

64. King VJ, Viswanathan M, Bordley WC, et al. Pharmacologic treatment of bronchiolitis in infants and children. Arch Pediatr Adolesc Med. 2004;158:127–137

65. Klassen TP, Sutcliffe T, Watters LK, Wells GA, Allen UD, Li MM. Dexamethasone in salbutamol-treated in patients with acute bronchiolitis: a randomized controlled trial. J Pediatr.1997; 130:191–196.

66. McCartney KK, Gorelick MH, Manning ML. Nosocomial respiratory syncytial virus infections: the cost effectiveness and cost benefit of

infection control. Pediatrics. 2000; 106:520–6. doi: 10.1542/peds.106.3.520.

67. Joseph L Mathew et al. Hypertonic Saline Nebulization for Bronchiolitis Indian Pediatrics Vol 45: December 17, page: 988 2008.

68. Deshpande SA, Northern V. The clinical and health economic burden of respiratory syncytial virus disease among children under 2 years of age in a defined geographical area. Arch Dis Child 2003;88:1065– 9.

69. Constantopoulos AG, Kafetzis DA et al. Burden of respiratory syncytial viral infections on paediatric hospitals: a two-year prospective epidemiological study. Eur J Clin Microbiol Infect Dis 2002 , 21:102-107

70. Holman RC, Shay DK, Curns ATet al. Risk factors for bronchiolitis-associated deaths among infants in the United States. Pediatr Infect Dis J.2003; 22 (6):483 –490

71. M A P S Downham, R Scott et al. Breast-feeding protects against respiratory syncytial virus infections. British Medical3Journal, 1976, 2, 274-276.

72. Toms GL, Pullan CR, Gardner PS, Scott M, Scott R. Anti-respiratory syncytial virus activity in human colostrum and milk. Arch Dis Child 1980:55:161-2.

73. Simoes EA, Carbonell-Estrany X. Impact of severe disease caused by respiratory syncytial virus in children living in developed countries. Pediatr Infect Dis J. 2003; 22(Suppl 2):S13–S18; discussion S18–S20.

74. Arena VC. Wood burning stoves and lower respiratory tract infections in American Indian children. AJDC 144:105-108 (1990).

75. Robin LF, Less PS, Winget M, et al.1996. Wood-burning stoves and lower respiratory illnesses in Navajo children. Pediatr Infect Dis J 15(10):859–865.

76. Giovanni A. Rossi, Maria Cristina Medici, Maria Cristina Arcangeletti, Marcello Lanari Risk factors for severe RSV-induced lower respiratory tract infection over four consecutive epidemics**.** Eur J Pediatr. 2007 December; 166(12): 1267–1272.

77. Marguet C, Lubrano M, Gueudin M et al. In very young infants severity of acute bronchiolitis depends on carried viruses. PLoS ONE 2009; 4: pe4596.

78. Di Carlo P, Romano A, et al. Epidemiological assessment of Respiratory Syncytial Virus infection in hospitalized infants, during the season 2005-2006 in Palermo, Italy. Ital J Pediatr. 2009 May 2; 35(1):11.

ANNEXURES

PROFORMA

- NAME OF THE CHILD : AGE : SEX :M/F
- ADDRESS :
- COUGH : YES / NO
- PROFUSE CORYZA : YES / NO
- SNEEZING : YES / NO
- FEVER : YES / NO
- SHORTNESS OF BREATH : YES / NO
- IRRITABLE CRY : YES / NO
- POOR FEEDING : YES / NO
- ASPIRATION WHILE FEEDING : YES / NO
- BAD CRP : YES / NO
- SKIN LESIONS : YES / NO
- GESTATIONAL AGE : TERM/PRETERM
- BIRTH WEIGHT : < 2.5 / >2.5 kg
- NICU ADMISSION : YES / NO
- PLACE OF DELIVERY : DOMICILIARY / INSTITUTIONAL
- EXCLUSIVE BREAST FEEDING : YES / NO
- BOTTLE FEEDING : YES / NO
- PARENTAL ASTHMA : YES / NO
- FAMILY TYPE : JOINT / NUCLEAR

- NO OF CHILDREN : ONE/ TWO/MORE THAN TWO
- SOCIO ECONOMIC STATUS : CLASS I / II / III / IV / V (MODIFIED KUPPUSAMY SCALE)
- PASSIVE SMOKING : YES / NO
- INDOOR ALLERGENS : YES / NO
- CONTACT WITH OPEN CASE OF ADULT TB : YES / NO
- URI IN FAMILY MEMBERS : YES / NO
- FEVER : $<39^0C$ $>39^0C$
- ***SEVERITY ASSESSING SCORE*** :

Score	Wheezing	Retraction	RR	HR	Ventilation	Cyanosis
0	No	No	<30	<120	Good Symmetrical	Yes
1	End expiratory	Subcostal/ Intercostal	31-45	>120	Regular Symmetrical	No
2	All expiratory	Supraclavicular + nasal flaring	45-60	-	Very reduced	-
3	Both inspiration and expiration	+intercostal + suprasternal	>60	-	Silent thorax	-

Mild: below 3 Moderate: 4-7 Severe: 8-14

- SPO_2 IN ROOM AIR : <92% >92%
- OXYGEN SUPPLEMENTATION &IV FLUIDS NEEDED : <72HRS >72HRS
- LABORATORY PARAMETERS :

  WBC COUNT/DC/CXR/CRP/NEC
- OUTCOME (duration of hospital stay) : < 7days > 7days

MASTER CHART

s.no	age	sex	cough	coryza	sneezing	fever	SOB	irritable cry	poor feeding	aspiration	birth wt.	EBF	bottle feeding	parental asthma	type of family	no. of children	socio economic status	passive smoking	indoor allergens	URI in family	severity	SPO2	O2&IVF needed	outcome
1	1	1	1	1	1	2	1	2	1	1	2	1	2	2	2	2	4	1	2	1	2	2	2	1
2	3	2	1	1	1	2	1	2	2	2	2	1	2	1	2	1	3	2	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	1	4	2	1	1	2	2	2	1
4	2	1	1	1	1	2	1	2	2	2	2	2	1	2	2	3	4	2	2	1	1	1	2	1
5	1	1	1	1	1	1	1	2	2	2	1	1	2	2	1	3	4	1	2	1	2	1	1	1
6	1	1	1	1	1	1	1	1	1	2	1	2	1	2	2	2	3	2	1	2	2	1	1	1
7	2	2	1	1	1	2	1	1	1	1	1	2	1	2	1	2	4	2	1	2	3	2	2	1
8	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	4	2	1	1	3	2	2	1
9	1	1	1	2	1	2	1	1	1	2	2	2	1	1	2	1	4	2	2	1	1	1	1	1
10	1	2	1	1	1	2	1	2	2	2	1	2	2	2	2	2	4	1	2	1	2	2	2	1
11	1	1	1	1	1	2	1	2	1	2	2	2	1	2	2	2	3	1	2	1	1	2	2	1
12	1	2	1	1	1	2	1	1	2	2	1	2	1	2	1	3	3	1	2	2	1	2	2	1
13	1	1	1	1	1	1	1	1	1	2	2	2	1	2	1	3	4	2	1	1	2	1	1	1
14	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	4	2	1	1	3	2	1	1
15	1	1	1	1	1	2	1	2	2	2	2	2	1	2	2	1	4	2	1	1	2	2	2	1
16	2	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	4	2	1	1	1	1	1	1
17	1	2	1	1	2	2	1	2	2	2	1	2	1	2	1	2	4	2	1	1	2	2	2	1
18	1	1	1	1	1	2	1	2	2	2	2	2	1	1	2	2	3	2	2	1	1	1	1	1
19	2	1	1	2	1	2	1	1	1	2	2	1	2	2	1	3	4	2	1	1	2	2	2	1
20	2	1	1	1	1	2	1	2	1	2	1	2	2	2	2	2	3	2	2	1	2	2	2	1
21	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	3	3	2	2	1	3	2	2	2
22	1	2	1	1	1	2	1	1	1	1	2	2	1	2	2	2	4	2	2	1	3	2	2	1
23	1	2	1	1	1	2	1	1	2	2	2	2	1	1	2	2	3	2	2	2	1	1	1	1
24	1	2	1	1	1	2	1	2	2	2	1	1	2	2	1	3	4	1	2	2	2	2	2	1
25	1	2	1	1	2	2	1	1	1	1	2	2	1	2	1	3	4	2	1	1	3	2	2	1
26	2	1	1	1	1	2	1	2	2	2	2	1	2	1	2	2	4	2	2	2	2	2	2	1
27	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	3	3	2	2	1	3	2	2	1
28	1	2	1	1	1	2	1	2	2	2	1	2	1	2	1	3	4	2	2	1	2	2	2	1
29	2	1	1	1	1	2	1	2	2	2	2	1	2	2	2	1	4	1	2	1	1	1	1	1

s.no	age	sex	cough	coryza	sneezing	fever	SOB	irritable cry	poor feeding	aspiration	birth wt.	EBF	bottle feeding	parental asthma	type of family	no. of children	socio economic status	passive smoking	indoor allergens	URI in family	severity	SPO2	O2&IVF needed	outcome
30	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	1	4	2	2	1	1	1	1	1
31	1	2	1	1	2	2	1	2	2	2	2	2	2	2	2	2	3	1	2	2	1	1	1	1
32	1	1	1	1	1	2	1	1	2	2	2	2	2	2	2	1	3	2	1	1	1	1	1	1
33	4	1	1	1	2	2	1	2	2	2	2	1	1	2	2	3	4	2	1	1	1	1	1	1
34	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	3	3	2	1	1	2	1	1	1
35	1	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	1	1	2	2	2	1	1
36	1	2	1	1	1	2	1	2	1	2	1	2	1	2	1	3	4	2	2	2	2	2	2	1
37	1	1	1	1	1	2	1	2	1	2	2	1	2	2	1	3	3	2	1	1	2	1	1	1
38	1	2	1	1	1	2	1	2	2	2	2	2	2	2	1	3	4	2	2	1	1	1	1	1
39	1	2	1	1	1	2	1	1	2	2	1	2	1	1	2	2	3	2	1	2	1	1	2	1
40	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	2	4	2	2	1	2	1	2	1
41	1	1	1	1	1	2	1	2	2	2	2	2	1	2	1	2	3	1	1	1	2	1	2	1
42	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	3	4	2	2	1	3	2	2	1
43	2	1	1	1	1	2	1	2	2	2	2	1	2	2	2	1	3	2	1	2	1	1	1	1
44	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	3	4	1	2	1	3	2	2	2
45	2	1	1	1	1	2	1	2	2	2	2	2	2	2	1	2	4	2	1	1	1	1	1	1
46	1	2	1	1	1	1	1	1	1	1	1	2	1	2	2	3	4	2	2	1	3	2	2	1
47	2	2	1	1	1	2	1	2	2	2	2	1	2	2	2	1	4	1	2	2	1	1	1	1
48	2	1	1	1	1	2	1	2	2	2	2	1	2	1	2	2	3	1	2	1	1	1	1	1
49	2	1	1	1	1	2	1	2	2	2	2	2	1	2	2	1	4	2	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	2	2	1	2	2	2	1	2	3	2	2	2	2	1	1	1
51	2	1	1	1	1	2	1	2	2	2	1	2	1	2	2	1	3	2	2	1	1	1	1	1
52	4	2	1	1	1	2	1	2	2	2	2	1	1	1	2	2	4	1	1	2	1	1	1	1
53	2	2	1	1	1	2	1	2	2	2	1	2	1	2	2	2	3	2	2	2	1	1	1	1
54	3	2	1	1	1	1	1	2	2	2	2	2	2	1	2	2	3	1	2	2	1	1	1	1
55	1	2	1	1	1	1	1	1	1	2	1	2	1	2	2	2	3	2	2	2	1	1	1	1
56	2	1	1	1	1	1	1	2	1	1	1	1	1	2	1	3	4	2	2	1	3	2	2	1
57	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	3	3	1	2	1	3	2	2	2
58	1	2	1	1	1	2	1	1	1	2	1	2	2	1	2	1	3	2	2	2	1	1	1	1

s.no	age	sex	cough	coryza	sneezing	fever	SOB	irritable cry	poor feeding	aspiration	birth wt.	EBF	bottle feeding	parental asthma	type of family	no. of children	socio economic status	passive smoking	indoor allergens	URI in family	severity	SPO2	O2&IVF needed	outcome
59	1	1	1	1	2	2	1	1	1	1	2	2	1	2	2	1	4	2	2	2	1	1	1	1
60	2	2	1	1	1	1	1	2	2	2	1	2	2	2	2	2	4	2	2	2	1	1	1	1
61	2	1	1	1	1	2	1	2	2	2	2	2	1	1	2	1	4	2	2	2	1	1	1	1
62	1	2	1	1	1	1	1	1	1	2	1	1	2	2	1	3	4	2	2	1	2	2	2	1
63	1	2	1	1	1	2	1	1	1	2	2	2	2	2	1	3	3	1	1	1	2	2	2	1
64	1	2	1	2	1	1	1	1	1	1	2	1	2	2	1	2	4	2	2	2	2	2	2	1
65	2	2	1	1	1	1	1	1	1	1	2	2	1	2	1	3	4	1	1	2	2	2	2	1
66	2	1	1	1	1	2	1	2	1	2	2	1	1	1	2	2	3	2	2	2	1	1	1	1
67	2	1	1	1	1	2	1	2	1	2	2	2	1	2	1	3	4	2	1	2	1	1	2	1
68	2	1	1	1	1	2	1	2	1	2	2	1	1	2	1	3	4	1	1	1	1	1	1	1
69	2	2	1	1	1	2	1	2	1	2	1	2	1	2	2	2	4	1	2	2	2	2	2	1
70	2	1	1	1	1	2	1	2	2	2	2	2	1	2	1	2	4	1	1	2	2	2	2	1
71	1	2	1	1	1	2	1	1	1	2	2	1	2	2	2	1	4	1	2	2	2	2	2	1
72	2	2	1	1	1	2	1	1	1	2	2	1	2	2	2	1	4	2	1	1	2	1	1	1
73	3	2	1	1	1	2	1	2	2	2	2	1	1	2	1	1	4	2	2	1	1	1	1	1
74	1	1	1	1	1	2	1	2	2	2	1	2	1	2	2	1	3	2	2	2	2	2	2	1
75	3	2	1	1	1	2	1	1	2	2	2	2	1	1	2	1	4	2	1	2	2	2	2	1
76	1	2	1	1	1	2	1	2	1	2	1	1	2	2	2	2	3	1	2	1	1	1	1	1
77	1	2	1	1	1	1	1	1	1	1	2	2	1	1	2	2	4	2	2	2	3	2	2	1
78	1	1	1	1	1	2	1	1	1	2	1	1	2	1	2	2	4	2	2	2	2	1	1	1
79	1	2	1	1	1	2	1	1	1	1	1	2	2	2	1	1	5	2	1	2	3	2	2	1
80	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	4	1	2	2	2	2	2	1
81	1	2	1	1	1	2	1	1	1	2	2	1	2	1	2	1	4	1	2	1	2	2	2	1
82	2	2	1	1	1	2	1	1	1	2	2	1	1	2	1	3	3	1	1	1	1	1	1	1
83	1	2	1	1	1	1	1	1	1	1	2	2	2	1	2	2	4	2	2	2	3	2	2	1
84	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	3	4	1	2	2	1	1	1	1
85	2	2	1	1	1	2	1	1	1	2	1	1	2	2	2	1	4	2	2	1	2	2	2	1
86	1	1	1	1	1	2	1	2	2	2	2	1	2	1	2	3	4	1	2	1	2	1	1	1
87	1	1	1	1	1	1	1	1	1	2	2	1	2	2	1	1	3	2	1	1	1	1	1	1

s.no	age	sex	cough	coryza	sneezing	fever	SOB	irritable cry	poor feeding	aspiration	birth wt.	EBF	bottle feeding	parental asthma	type of family	no. of children	socio economic status	passive smoking	indoor allergens	URI in family	severity	SPO2	O2&IVF needed	outcome
88	1	2	1	1	1	2	1	1	1	2	2	1	2	2	1	3	3	2	2	1	1	1	1	1
89	1	2	1	1	1	1	1	1	1	2	2	1	2	2	1	2	4	1	2	2	2	2	2	1
90	1	2	1	1	1	1	1	1	1	2	2	2	1	2	2	1	3	1	2	1	1	1	1	1
91	1	2	1	1	1	2	1	2	2	2	2	1	1	2	1	1	4	1	2	2	2	2	2	1
92	4	1	1	1	1	2	1	2	1	2	2	2	1	1	2	1	3	2	2	1	1	1	1	1
93	1	1	1	1	1	2	1	1	1	1	1	2	1	1	2	1	3	1	1	2	2	2	2	1
94	3	1	1	1	1	1	1	2	2	2	2	1	2	2	1	3	3	2	2	1	1	1	1	1
95	1	1	1	1	1	2	1	2	2	2	2	1	1	2	1	1	2	2	2	2	1	1	1	1
96	1	2	1	1	1	2	1	1	1	1	1	1	1	2	1	1	4	2	2	1	3	2	2	2
97	3	1	1	1	1	1	1	2	2	2	2	1	1	2	2	1	4	1	2	1	1	1	1	1
98	1	2	1	1	1	2	1	2	2	2	1	1	1	2	2	1	4	1	1	1	3	2	2	1
99	2	2	1	1	1	2	1	2	1	2	2	1	1	1	2	1	5	2	1	1	2	2	2	1
100	3	1	1	1	1	2	1	2	2	2	1	2	1	1	2	3	4	2	2	1	3	2	2	1
101	2	1	1	1	1	2	1	2	1	1	2	2	1	2	2	2	3	2	1	2	1	1	1	2
102	1	1	1	1	1	1	1	1	2	2	2	1	2	2	1	3	4	2	2	2	2	2	2	1
103	2	1	1	1	1	1	1	2	2	2	2	1	1	2	1	3	3	1	2	1	1	1	1	1
104	1	1	1	1	1	2	1	2	1	2	1	2	1	2	1	3	3	2	2	2	1	1	1	1
105	2	2	1	1	1	2	1	2	2	2	1	2	2	1	2	1	4	1	2	1	3	2	2	2
106	2	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	4	2	2	2	3	2	2	1
107	1	1	1	1	1	2	1	2	2	2	2	1	2	2	2	1	3	2	2	2	1	1	1	1
108	1	1	1	1	1	2	1	1	2	1	2	2	2	2	1	3	4	1	2	2	3	2	2	1
109	1	2	1	1	1	2	1	1	1	1	1	2	1	2	1	2	3	1	1	1	2	2	2	1
110	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	3	5	1	1	2	3	2	2	1
111	2	1	1	1	1	2	1	2	1	1	2	2	1	1	2	2	4	1	1	1	3	2	2	1
112	2	2	1	1	1	1	1	1	1	2	1	2	1	2	1	3	4	2	2	1	3	2	2	1
113	1	1	1	1	1	1	1	2	1	2	2	2	1	2	2	1	4	1	1	1	2	1	1	2
114	1	1	1	1	1	2	1	2	1	2	2	2	1	1	1	3	5	1	1	1	2	2	2	1
115	1	1	1	1	1	2	1	2	2	2	2	2	1	2	1	3	3	2	2	1	1	1	1	1
116	2	2	1	1	1	2	1	2	2	2	2	1	1	1	2	1	4	2	2	2	1	1	1	1

s.no	age	sex	cough	coryza	sneezing	fever	SOB	irritable cry	poor feeding	aspiration	birth wt.	EBF	bottle feeding	parental asthma	type of family	no. of children	socio economic status	passive smoking	indoor allergens	URI in family	severity	SPO2	O2&IVF needed	outcome
117	3	1	1	1	1	2	1	2	2	2	2	1	2	2	1	3	4	1	2	1	1	1	1	1
118	2	2	1	1	1	2	1	2	2	2	2	1	1	2	2	1	3	1	1	1	2	2	2	1
119	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	4	1	1	2	2	1	1	1
120	1	1	1	1	1	2	1	2	1	2	1	2	1	2	1	3	4	1	2	1	1	1	1	1
121	4	2	1	1	1	2	1	2	2	2	2	1	1	2	1	1	3	1	1	1	2	1	1	2
122	1	1	1	1	1	2	1	2	1	2	2	2	1	2	2	1	4	2	2	1	1	1	1	1
123	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	3	4	1	2	1	3	2	2	1
124	3	1	1	1	1	2	1	2	1	2	2	1	2	1	2	1	4	2	1	2	2	2	2	1
125	1	2	1	1	1	2	1	2	2	2	2	2	1	2	1	3	4	1	2	1	1	1	1	1
126	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	4	1	2	2	3	2	2	1
127	1	1	1	1	1	1	1	1	1	2	2	2	1	2	2	1	3	2	2	2	1	1	1	1
128	2	2	1	1	1	2	1	2	2	2	2	2	1	2	2	1	3	2	2	2	1	1	1	1
129	1	1	1	1	1	1	1	1	1	1	2	2	1	2	1	3	4	1	2	1	3	2	2	1
130	2	1	1	1	1	2	1	1	1	1	1	1	1	2	2	1	3	2	1	1	2	2	2	1
131	2	2	1	1	1	2	1	2	2	1	2	1	1	2	1	3	4	2	2	1	2	2	2	1
132	2	1	1	1	1	2	1	2	1	2	1	1	2	1	2	2	4	2	1	2	1	1	1	1
133	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	1	4	1	2	1	3	2	2	2
134	2	1	1	1	1	2	1	2	2	2	2	2	1	2	1	1	4	1	2	2	1	2	1	1
135	2	1	1	1	1	2	1	2	2	2	2	1	2	2	1	1	4	1	2	2	1	1	1	1
136	1	1	1	1	1	2	1	2	2	2	2	1	2	2	2	1	3	1	2	2	1	1	1	1
137	1	1	1	1	1	1	1	1	1	2	1	1	2	2	1	3	3	2	2	1	2	2	2	1
138	1	2	1	1	1	2	1	2	2	2	2	2	1	2	2	1	3	1	1	1	3	2	2	1
139	2	1	1	1	1	2	1	2	2	2	1	1	1	1	2	1	3	1	2	1	3	2	2	1
140	1	2	1	1	1	2	1	1	1	2	2	2	1	2	2	1	3	2	2	1	2	2	2	1
141	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	4	1	2	2	2	2	2	1
142	2	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	4	2	2	2	1	1	1	1
143	1	1	1	1	1	2	1	1	1	1	2	1	2	1	1	2	5	2	1	1	2	2	2	2
144	1	1	1	1	1	2	1	2	1	2	2	1	2	2	1	2	4	2	1	2	1	1	1	1
145	1	1	1	1	1	2	1	2	2	2	2	2	1	2	2	1	3	1	2	2	1	1	1	1

s.no	age	sex	cough	coryza	sneezing	fever	SOB	irritable cry	poor feeding	aspiration	birth wt.	EBF	bottle feeding	parental asthma	type of family	no. of children	socio economic status	passive smoking	indoor allergens	URI in family	severity	SPO2	O2&IVF needed	outcome
146	1	1	1	1	1	1	1	1	1	2	1	2	1	2	1	3	4	2	2	1	2	2	2	1
147	3	1	1	1	1	2	1	2	2	2	2	1	2	1	2	1	4	1	2	1	1	1	1	1
148	3	1	1	1	1	2	1	2	2	2	1	2	1	2	2	1	4	2	2	2	1	1	1	1
149	2	1	1	1	1	2	1	1	2	2	2	1	2	2	2	1	5	2	2	2	1	1	1	1
150	2	2	1	1	1	2	1	1	1	2	1	1	2	1	2	3	5	2	2	2	2	2	1	1
151	1	1	1	1	1	2	1	1	1	1	2	2	1	2	1	1	5	1	1	1	3	2	2	1
152	1	2	1	1	1	1	1	1	1	2	2	1	2	2	1	1	2	2	2	2	1	1	1	1
153	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	4	2	2	2	2	2	2	1
154	1	1	1	1	1	2	1	1	1	2	2	1	2	2	2	2	4	2	2	2	1	1	1	1
155	1	2	1	1	1	1	1	2	2	1	1	2	1	2	1	2	4	2	2	2	2	1	1	1
156	3	2	1	1	1	2	1	2	2	2	2	2	1	2	2	2	4	1	2	2	1	1	1	1
157	2	1	1	1	1	2	1	1	2	2	2	1	2	2	1	3	4	1	2	2	2	2	2	1
158	1	1	1	2	1	2	1	1	2	2	2	1	2	2	1	2	5	1	2	1	2	1	1	1
159	2	2	1	1	2	1	1	1	2	2	2	1	2	2	1	3	4	2	2	1	2	1	1	1
160	1	2	1	1	2	2	1	1	1	2	1	1	2	2	2	3	4	1	2	1	2	1	1	1
161	3	2	1	1	2	2	1	1	2	2	2	1	2	1	1	3	4	2	2	2	2	1	1	1
162	1	1	1	1	1	2	1	2	2	2	2	1	2	2	2	2	3	1	2	2	2	1	1	1
163	2	2	1	1	2	2	1	1	1	2	2	1	2	1	1	3	4	1	2	1	2	1	1	1
164	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	1	2	2	2	2	1	1	1	1
165	1	1	1	1	1	2	1	2	1	1	2	1	2	2	2	2	4	1	2	1	2	1	1	1
166	2	1	1	1	1	2	1	2	2	2	2	1	2	1	2	3	4	2	2	2	1	1	1	1
167	3	1	1	1	1	1	1	2	2	2	2	1	1	2	1	3	4	1	2	1	1	1	1	1
168	1	2	1	1	1	1	1	1	1	2	1	2	1	2	1	2	5	2	2	1	1	1	1	2
169	1	2	1	1	1	2	1	1	2	2	2	2	1	2	1	3	4	1	1	1	3	2	2	2
170	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	5	1	1	2	3	2	2	1
171	3	1	1	1	2	1	1	2	1	2	2	1	1	2	2	2	3	1	1	2	2	1	1	1
172	3	2	1	1	1	2	1	2	2	2	1	2	1	2	2	3	4	2	1	2	2	1	1	1
173	2	2	1	1	2	2	1	2	2	2	2	2	1	2	2	3	4	1	1	2	3	2	2	1
174	3	1	1	1	1	2	1	2	1	2	2	1	2	1	2	1	3	1	2	1	1	1	1	1

s.no	age	sex	cough	coryza	sneezing	fever	SOB	irritable cry	poor feeding	aspiration	birth wt.	EBF	bottle feeding	parental asthma	type of family	no. of children	socio economic status	passive smoking	indoor allergens	URI in family	severity	SPO2	O2&IVF needed	outcome
175	2	1	1	1	1	1	1	1	2	1	1	2	1	2	2	3	4	1	1	2	2	2	2	1
176	1	2	1	2	1	2	1	2	1	2	2	2	1	2	1	3	4	1	1	2	3	2	2	1
177	1	2	1	1	1	2	1	1	1	2	2	2	1	2	1	1	4	1	1	2	2	1	1	1
178	2	2	1	2	1	2	1	1	1	2	1	2	1	2	1	2	3	2	1	1	2	2	2	1
179	4	2	1	1	2	2	1	2	2	2	1	2	1	2	1	2	4	2	2	1	2	1	1	1
180	2	2	1	1	2	1	1	1	1	1	2	2	1	2	1	2	3	2	2	1	2	1	1	1
181	3	1	1	1	1	2	1	2	2	1	1	2	1	2	2	3	4	1	1	2	3	2	2	1
182	1	2	1	1	1	1	1	1	1	2	2	1	2	2	2	1	3	1	2	2	2	2	2	1
183	1	2	1	1	2	2	1	2	2	2	2	1	2	2	2	1	4	2	2	2	1	1	1	1
184	2	2	1	1	1	2	1	2	2	2	2	1	2	2	1	3	4	2	1	2	2	2	2	1
185	3	1	1	1	2	1	1	2	2	2	2	1	1	2	2	1	3	2	2	2	1	2	2	1
186	2	2	1	2	2	1	1	1	1	2	1	2	1	1	1	3	4	1	2	1	3	2	1	1
187	4	1	1	1	2	2	1	2	1	2	2	1	2	1	1	3	4	1	1	2	2	2	2	1
188	2	1	1	1	1	2	1	2	1	2	2	1	2	2	1	3	4	2	2	2	1	1	1	1
189	1	1	1	1	1	2	1	1	1	1	1	2	1	2	1	2	4	1	2	2	1	1	1	1
190	1	1	1	1	2	2	1	1	1	2	1	2	1	2	1	3	4	1	2	2	1	1	1	1
191	1	1	1	1	2	2	1	1	1	2	1	2	1	2	1	2	3	2	1	1	2	2	2	1
192	1	2	1	1	1	2	1	1	1	1	2	1	2	2	2	1	5	2	1	2	2	2	2	1
193	2	1	1	1	1	2	1	1	1	2	2	2	1	2	1	3	4	1	1	2	2	1	1	1
194	1	1	1	1	1	2	1	1	1	1	2	2	1	2	1	3	5	1	1	1	3	2	2	2
195	1	1	1	1	1	2	1	1	2	1	1	2	1	2	1	3	3	1	1	1	3	2	2	2
196	2	1	1	1	1	2	1	1	1	2	1	2	1	2	1	3	4	1	2	1	1	1	1	1
197	1	1	1	1	2	2	1	1	1	2	2	2	1	2	2	2	5	2	1	1	1	1	1	1
198	1	2	1	2	1	2	1	1	1	2	1	2	1	2	2	1	3	1	2	1	2	1	1	1
199	3	1	1	1	1	2	1	2	1	2	1	1	1	2	1	2	5	2	2	1	1	1	1	1
200	2	1	1	1	2	2	1	2	1	2	2	1	1	2	2	2	4	2	2	1	1	1	1	1
201	1	1	1	1	1	2	1	1	1	2	1	2	1	2	2	2	4	1	1	2	2	2	2	1
202	1	1	1	1	1	2	1	1	1	2	2	2	1	2	2	2	4	1	2	1	2	1	1	1
203	2	2	1	1	1	2	1	1	2	2	2	2	1	1	1	3	5	1	2	1	1	1	1	1

s.no	age	sex	cough	coryza	sneezing	fever	SOB	irritable cry	poor feeding	aspiration	birth wt.	EBF	bottle feeding	parental asthma	type of family	no. of children	socio economic status	passive smoking	indoor allergens	URI in family	severity	SPO2	O2&IVF needed	outcome
204	1	2	1	2	1	2	1	1	1	1	1	2	1	2	1	3	4	1	2	1	3	2	2	1
205	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	3	1	2	1	2	2	2	1
206	1	2	1	2	1	2	1	2	2	1	2	2	1	1	2	2	4	2	1	1	2	2	2	1
207	1	1	1	1	1	2	1	1	1	1	2	2	1	2	2	2	4	1	2	1	3	2	2	1
208	1	1	1	1	1	1	1	1	1	2	1	2	1	2	1	3	5	1	2	1	2	2	2	1
209	2	2	1	1	1	2	1	1	1	1	1	2	1	1	2	2	5	1	2	1	3	2	2	1
210	1	2	1	1	1	1	1	1	1	2	1	2	1	2	1	3	3	2	2	1	1	1	1	1
211	1	2	1	1	1	2	1	1	1	2	1	2	1	2	2	2	4	2	1	1	2	2	2	1
212	1	2	1	1	1	2	1	2	2	2	2	2	1	1	1	3	3	2	2	2	2	2	2	1
213	2	1	1	2	1	1	1	1	1	1	1	2	2	2	2	2	5	2	1	1	2	2	2	1
214	2	2	1	1	1	2	1	1	2	2	2	2	1	2	1	3	3	2	2	1	1	1	1	1
215	1	2	1	1	1	2	1	2	1	2	2	2	1	1	2	2	3	1	2	1	1	1	1	1
216	1	2	1	1	1	1	1	2	2	1	1	2	1	2	1	3	4	1	2	2	3	2	2	2
217	1	2	1	1	1	2	1	1	1	2	1	2	1	2	2	2	3	2	2	1	2	2	2	1
218	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	3	3	1	2	1	2	1	1	1
219	1	2	1	1	1	2	1	1	1	2	2	1	2	2	2	2	3	2	2	1	1	1	1	1
220	1	1	1	1	1	1	1	1	1	2	1	1	2	2	1	3	4	1	1	1	2	2	2	1
221	1	1	1	1	1	2	1	1	1	2	2	1	2	2	1	3	4	1	2	1	2	1	1	1
222	2	2	1	1	1	2	1	1	1	2	1	2	1	1	1	1	4	1	1	1	3	2	2	2

KEY TO MASTER CHART

AGE : 1. 1- 6months 2. 7-12months

3. 13-18months 4. 19-24months

SEX : 1.MALE 2.FEMALE

COUGH : 1.YES / 2.NO

PROFUSE CORYZA : 1.YES / 2. NO

SNEEZING : 1.YES / 2. NO

FEVER : 1. YES / 2. NO

SHORTNESS OF BREATH : 1.YES / 2. NO

IRRITABLE CRY : 1.YES / 2. NO

POOR FEEDING : 1. YES / 2. NO

ASPIRATION WHILE FEEDING : 1.YES / 2. NO

BIRTH WEIGHT : 1.< 2.5 / 2.>2.5 kg

EXCLUSIVE BREAST FEEDING : 1.YES / 2.NO

BOTTLE FEEDING : 1.YES / 2. NO

PARENTAL ASTHMA : 1.YES / 2. NO

TYPE OF FAMILY : 1.JOINT/2.NUCLEAR

NO. OF CHILDREN : 1.ONE/ 2.TWO/3.MORE THAN TWO

S E S : 1.CLASS I /2. CLASS II /3.CLASS III / 4.CLASS IV /

5.CLASS V

PASSIVE SMOKING : 1. YES / 2. NO

INDOOR ALLERGENS : 1. YES / 2. NO

URI IN FAMILY MEMBERS : 1.YES /2. NO

SEVERITY ASSESSING SCORE :

1. MILD 2.MODERATE 3.SEVERE

SPO_2 IN ROOM AIR : 1. <92% 2. >92%

OXYGEN &IV FLUIDS NEEDED : 1. <72HRS 2. >72HRS

OUTCOME (duration of hospital stay): 1. < 7days 2. > 7days

ABBREVATIONS

ABBREVIATIONS

AAP	-	American Academy of Pediatrics
RSV	-	Respiratory Syncytial Virus
LRTI	-	Lower Respiratory Tract Infection
HMPV	-	Human Metapneumovirus
NANC	-	non adrenergic non cholinergic system
CGRP	-	Calcitonin gene-related peptide
ADCC	-	Antibody dependent cell mediated cytotoxicity
CLD	-	Chronic Lung Disease
BPD	-	Bronchopulmonary Dysplasia
ETS	-	Environmental Tobacco Smoke
SHS	-	Second Hand Smoke
LTE_4	-	Leukotriene E_4
SBI	-	Serious Bacterial Infection
UTI	-	Urinary Tract Infection

Spo_2	-	Oxy-hemoglobin saturation
ADH	-	Anti Diuretic Hormone
RCT	-	Randomized Controlled Trial
CHD	-	Congenital Heart Disease
FDA	-	Food and Drug Administration
EBF	-	Exclusive Breast Feeding
CRP	-	C –reactive protein
CXR	-	Chest X Ray
LBW	-	Low Birth Weight
URI	-	Upper Respiratory Tract Infection
SES	-	Socio-Economic status